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ABSTRACT

The Elementary and Secondary Education Act and other U.S. Department of Education programs are already available to support mathematics instruction and yet these resources, particularly those of Title I, the largest source of federal funding for elementary and secondary schools, remain largely untapped for standards-based mathematics education. School districts have often sought additional funds to support mathematics improvement efforts while overlooking federal resources that are already available to them for this purpose. The 1994 reauthorization of Title I made clear the expectation that these resources be used to help all students achieve high academic standards in mathematics and reading as well as reflect the belief that this is best accomplished by coordinating the use of Title I money with other local, state, and federal funds. In order to learn more about how districts are using Title I funds to support mathematics instruction and how well these programs are being integrated with other local, state, and federally funded programs, the U.S. Department of Education and the National Science Foundation (NSF) asked Horizon Research, Inc., (HRI) to interview administrators in selected school districts around the country. This report, based on the results of a 1998 17-district survey and 5 in-depth district case studies, examines the ways in which federal, state, and local resources were effectively coordinated to support improved student achievement in mathematics. (ASK)

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Contents

Coordinating Resources to Support Standards-Based Mathematics Education Programs 1

Introduction: Mathematics Improvement and Title I 1

Research Phase I: District Interviews 2

Research Phase II: District Profiles 5

Appendix A • Districts Interviewed in Research Phase I 11

Appendix B • Districts Profiled in Research Phase II 13

Memphis City Schools 14

Norwich Public Schools 22

San Francisco Unified School District 30

Traverse City Area Public Schools 39

Ysleta Independent School District 47

Coordinating Resources to Support Standards-Based Mathematics Education Programs

Introduction: Mathematics Improvement and Title I

The results of the Third International Mathematics and Science Studies (TIMSS) are encouraging with respect to the state of elementary mathematics education. However, the eighth- and twelfth-grade results reinforced concerns about the condition of middle and high school mathematics education. In the wake of the TIMSS reports, educators nationwide are asking how they can best support the development and implementation of challenging, standards-based mathematics education programs at all grade levels.

There is a growing knowledge base among U.S. educators about how children learn mathematics. Available research points to the need for increased academic expectations for all students and for a major retooling of curriculum, instruction, assessment, and professional development in mathematics education. Given the magnitude of resources needed to implement high-quality, standards-based programs and the limitations of state and district budgets, a number of state and local education agencies have sought external funds (most notably systemic reform grants from the National Science Foundation) with which to improve their mathematics education programs. The Elementary and Secondary Education Act and other U.S. Department of Education programs are already available to support mathematics instruction; yet these resources, particularly those of Title I, the largest source of federal funding for elementary and secondary schools, remain largely untapped for standards-based mathematics education.

Title I is a formula-grant that is allocated to states, districts, and schools on the basis of the number of economically disadvantaged students in the jurisdiction. These funds are earmarked to provide supplemental instructional services to students who are at risk of failing to meet the state's content and performance standards. Although Title I funds can be used to support multiple educational services and schoolwide improvement efforts, funds have traditionally been used for supplemental reading services. Many districts and schools justify heavier investments of Title I in reading instruction than in mathematics instruction on the grounds that students cannot succeed in mathematics (or any other subject) if they cannot read the textbook, the teacher's instructions, and so on. In such situations, either Title II/Eisenhower money is considered sufficient to support mathematics education or districts apply for other external resources to fund mathematics improvement programs.

Even when Title I money is used for mathematics instruction, two related factors have historically limited the use of these funds to support standards-based mathematics programs:

- Expectations for Title I students have typically been low. To give Title I students individualized attention (and to keep them from slowing down the rest of the class), they have been pulled out of their regular classrooms and given remedial mathematics instruction that was not well coordinated with the overall mathematics education program.

- Over time, Title I programs have developed their own bureaucracies with budgets, plans, and administrators that are separate from those of other federal, state, and district programs. Some of this has occurred out of a need to monitor compliance with Title I requirements. But this practice is also consistent with the belief that Title I students are fundamentally less able than other students and therefore should not be held to the same high standards as other, more able students.

Given this academic and administrative isolation, many Title I programs have remained impervious to the influence of mathematics improvement programs that are targeted to the general student population.

The 1994 reauthorization of ESEA has placed high standards for all students at the center of Title I. The current legislation requires that all states develop challenging academic standards in reading and mathematics by fall 1997 and that state testing programs be aligned with these standards by the year 2000. Furthermore, the assessments that are used to measure the academic performance of Title I students must be the same as those used for all other students.

The 1994 law also gives districts with greater flexibility in how they manage and use Title I resources. Districts can consolidate plans and administrative funds for Title I and other federal programs instead of submitting separate plans for each program. Schools with at least 50 percent of the student body meeting the low-income criterion can use their Title I allotment to support schoolwide improvement programs, as opposed to restricting these funds for specific Title I students. Other legitimate uses of Title I include offering professional development for teachers and continuing education for paraprofessionals, upgrading the curriculum to align with state standards, purchasing instructional materials, and providing extended-day instruction for students in need of additional help.

In summary, districts have often sought additional funds to support mathematics improvement efforts while overlooking federal resources that are already available to them for this purpose. The 1994 reauthorization of Title I made clear the expectation that these resources be used to help all students achieve high academic standards in mathematics as well as in reading and also reflected the belief that this is best accomplished by coordinating the use of Title I money with other local, state, and federal funds. In addition, the legislation provides districts with some new tools for using Title I in support of standards-based mathematics programs, including consolidated planning and budgeting.

Research Phase I: District Interviews

To learn more about how districts are using Title I funds to support mathematics instruction and how well these programs are being integrated with other local, state, and federally funded programs, the U.S. Department of Education and the National Science Foundation asked Horizon Research, Inc. (HRI) to interview administrators in selected school districts around the country (see list in appendix A). These districts were nominated by federal program administrators as showing promise in one or more of the following areas: the implementation of challenging academic standards in mathematics; the coordination of local, state, and federal money (including Title I and other Department of Education programs) to support standards-based mathematics education programs; and improvement in mathematics achievement, especially increased achievement of low-income students.

District interviews were conducted between March and May of 1998. In the first phase of this research project, we interviewed one person in each district—typically an assistant or associate superintendent of curriculum and instruction, a mathematics coordinator, or the coordinator of state and federal programs. The purpose of the interviews was to find out—

- how federal programs are coordinated with state and local funds at the district level;
- how Title I resources are used to support mathematics instruction; and

- what advice district staff have for other districts that are trying to improve resource-coordination efforts in support of standards-based mathematics programs.

Models of Resource Coordination

Across the seventeen districts, we noted three general models for coordinating district-level resources, including Title I money. Each district we interviewed described some variation on one of these models. One way to clarify important differences in the structure of organizational models is to give them familiar visual referents. In this instance, we likened each model to some variation on the human hand. The complexity of the "hand models" for resource coordination varies with the level of personal interactions they entail. This, in turn, correlates to some extent with the size of the district.

- Model 1: Fist

  In the small districts we interviewed, we generally found that district-level resources are coordinated by a single person, usually an assistant or associate superintendent for curriculum and instruction. This person knows what resources are available to support mathematics instruction and obtains mathematics content expertise as needed by consulting other district or school personnel. The main threat to the effectiveness of this model is the possibility of turnover, when the one person who knows the most about how available resources can be used leaves the district. Another weakness of this model is that it relies on the judgement of a single person and does not benefit from other perspectives.

- Model 2: Open palm with outspread fingers

  Among the medium and larger-sized districts in our interview sample, we sometimes found a more open model in which responsibility for the coordination of funds and mathematics content expertise is delegated to midlevel managers. In this model, fund coordinators and content supervisors report to a single district administrator who is responsible for ensuring that the various efforts are well aligned. However the fund coordinators and content supervisors do not interact regularly except on an informal basis. The weakness in this model is its reliance on the lone, upper-level administrator to see all the connections and possibilities for collaboration between funds and curriculum programs. One minor compensation for the lack of interaction between fund coordinators and content supervisors may be the existence of content and performance standards to which mid-level managers align their plans and budgets. However, relying on the standards alone to focus effective resource use assumes that everyone has the same understanding of the standards. More typically, a shared understanding of state and district standards requires regular, ongoing forums in which to iron out conceptual and vocabulary differences and to increase opportunities for leveraging resources and avoiding the duplication of services.

- Model 3: Open palm with webbed fingers

  Potentially the strongest model is one in which a central administrator facilitates and oversees regular meetings between fund coordinators and content supervisors. These formal, systematic interactions—represented by the webbing in the hand model—enable districts to pull together information about the needs of different student populations, the demands of a challenging curriculum, and detailed knowledge of how resources can and cannot be used. In smaller districts, a similar form of webbing involves regular meetings between a central office administrator who is responsible for curriculum and instruction and a group of curriculum coordinators or instructional facilitators who represent individual schools in the district.

Uses of Title I for Mathematics Instruction

The districts we interviewed varied considerably in the degree to which they use Title I funds to support mathematics instruction. Estimates of the percentage of a district's Title I allotment that is used for mathematics education ranged from none to approximately 50 percent. In most of these districts, school-based decision-making teams determine whether the money should be used for reading, mathematics, or both. Once the money is budgeted for mathematics instruction, teachers and department chairs typically decide how it will be used.

The districts in our sample also varied in the degree to which they have taken advantage of the increased flexibility and greater focus on high standards in mathematics in the 1994 reauthorization of Title I. According to federal guidelines, appropriate uses of Title I money at the district level include—

- hiring a district-level mathematics content specialist who provides professional development and technical assistance to schools and teachers as they implement standards-based mathematics education programs; and
- purchasing software and other materials to support the work of district-level "action teams," which are charged with helping boost mathematics achievement in low-performing schools.

Consistent with current Title I requirements, the uses of Title I at the building level can include—

- providing paraprofessionals with professional development in standards-based mathematics, assigning them to work under the direct supervision of certified teachers during the regular class period, and enabling them to work with struggling students as problems arise;
- extending the school day to offer additional instruction in mathematics to students who are having difficulty; and
- purchasing standards-based instructional materials and training teachers to use them.

Advice to Other Districts

The most consistent advice offered by our interviewed districts was to establish a common vision, communicate it well, and bring together people from all levels of the system and all facets of the education community (including parents) to develop a long-range plan for achieving that vision.

> You have to be a vocal advocate for what you think is good math. You have to be sure that you know who controls what, who the decision-makers are. And you have to be very sure that the decision-makers understand your vision, and are in accord with strategies that you feel are important or essential to having math reform....If the people above you don't share your vision, you're never going to get anywhere. [District Mathematics Supervisor]

> I think the first thing is building a common vision that is focused on the future. The wisest advice we got in this whole thing was that there are three things you need to work on every year for your school reform—awareness, awareness, awareness. And that continues to be a theme. That future focus on the need for change so that kids can be successful in their future rather than our past is crucial. And that needs to include community as well as staff. That's a crucial first step, I think. [Assistant Superintendent for Curriculum and Instruction]

> I think the key to it is having a district plan. I don't think the [Urban Systemic Initiative] or other initiatives in districts work unless there is an overarching umbrella that helps to support it and ties it all together. To me that is really the [crux] of the whole thing. [District USI Director]

Research Phase II: District Profiles

Although vision, communication, and collaborative planning were the dominant themes in the advice provided by the districts we interviewed, several of them stood out because they recognized the complexity of coordinating resources to support a high-quality, standards-based mathematics education program. Resource coordination went beyond having fund coordinators and program managers keep each other informed about how they intend to use their money. Districts engaged in coordinated planning to avoid duplicating schedules and expenditures. In addition, they engaged in other supporting, reinforcing, and sustaining activities that need to occur. In effect, their efforts at comprehensive resource coordination reflect the true intentions of the reauthorized Title I legislation.

To better understand how these districts support resource coordination efforts, HRI staff, assisted by staff at the U.S. Department of Education and the National Science Foundation, selected for further exploration five districts with extensive coordination representing different regions of the country and a variety of demographic compositions. Field work was conducted from July to September, 1998. HRI staff typically spent two days in each district, interviewing district and school administrators and reviewing relevant documents. A profile of each of the following districts was prepared to illustrate the kinds of comprehensive resource coordination that is occurring within these systems:

- Memphis (Tennessee) City Schools
- Norwich (Connecticut) Public Schools
- San Francisco (California) Unified School District
- Traverse City (Michigan) Area Public Schools
- Ysleta (El Paso, Texas) Independent School District

As we got to know these five districts better, we came to understand comprehensive resource coordination in support of higher student mathematics achievement as being a function of four related phases of planning and implementation (fig. 1):

- Establishing a shared vision of high-quality mathematics education that is reflected in challenging academic standards for all children in the district
- Coordinating resources by assessing student performance and needs relative to the district's vision for high-quality mathematics, developing strategies to meet students' needs, and consolidating appropriate resources to implement those strategies
- Supporting schools to implement standards-based curriculum, instruction, and assessment practices in mathematics
- Sustaining school efforts and accomplishments toward the continued improvement of mathematics education

The districts we studied are moving through the four phases of coordination in a variety of ways. But, regardless of how the districts are carrying them out, these phases describe what progressive districts are striving to do to ensure that all appropriate resources are brought to bear to improve mathematics education programs for all students.

Establishing a Shared Vision

Districts are using a variety of strategies to bring together policymakers, educators, and members of the community at large for the purpose of deciding what a comprehensive and coherent mathematics education program should look like in their communities. Sometimes the vision for mathematics is an outgrowth of a broader discussion that includes all core subject areas.

> In the case of Norwich, Connecticut, the district received private foundation funding to hold a communitywide forum on student preparedness for success in school. As a result, the district embraced the philosophy that school readiness is crucial to high

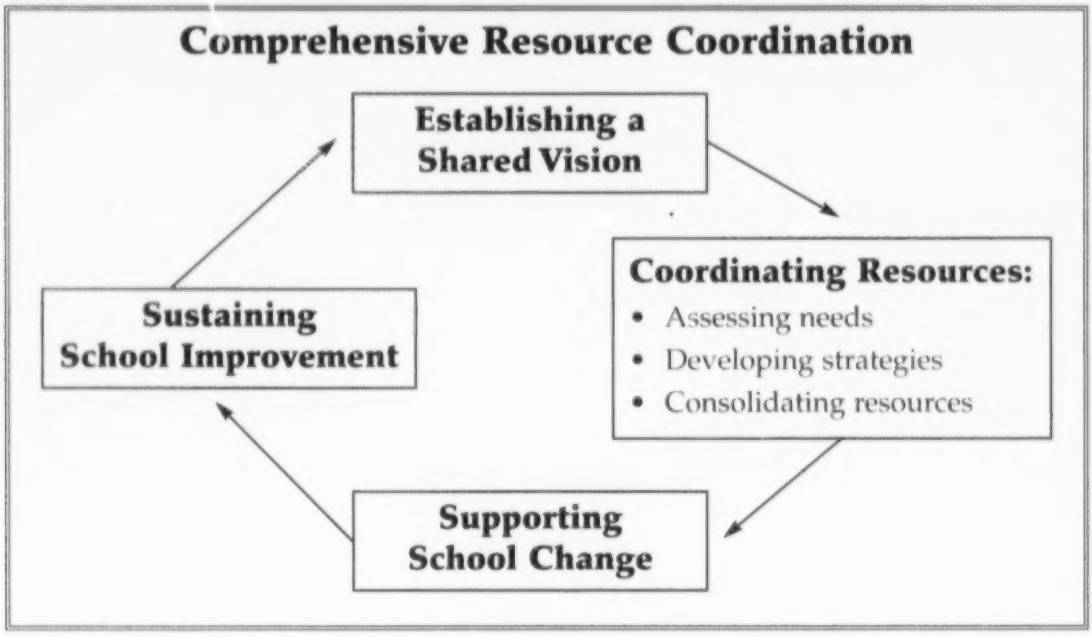

Figure 1

achievement in all core subjects, including mathematics. The new state content and achievement standards provided a clear picture of what they need to prepare students to be able to do.

In Traverse City, Michigan, a district mathematics coordinator convened a group of teachers, principals, school counselors, and parents specifically to examine the NCTM standards and decide how they should be implemented in their classrooms. Now known as the Mathematics Steering Committee, this group continues to monitor progress in mathematics achievement at all grade levels and to refine the district's long-range plan for mathematics education as needed.

As the examples above suggest, the development of specific standards for high-quality mathematics (usually based on state standards, national standards, or both) as well as a long-range plan for mathematics improvement are typical outcomes of the visioning process. One strategy for deepening the community's understanding of the district's vision is to communicate broadly about the importance of locally adopted standards and what it will take to achieve them.

For several years, the San Francisco Unified School District has engaged in a "collective conversation" with educators, parents, and other community members to raise awareness of the district's academic goals and standards. Through school-based meetings, parent focus groups, and the dissemination of an informational brochure, the district has sought to broaden awareness of, and support for, its content and performance standards.

Coordinating Resources

Having a shared vision for all students (i.e., both standards and a long-range mathematics improvement plan) provides a focal point for a needs assessment, the development of appropriate instructional strategies, and the consolidation of resources. Lessons learned in the initial district interviews include the importance of (1) using data to identify needs and guide

the development of appropriate strategies to address these needs, (2) exchanging information with all other service providers in the district to solve mutual problems and avoid the duplication of efforts, and (3) identifying all available resources and how they can and cannot be used. In actual practice, this kind of resource coordination is occurring at both the district and the school levels.

To update and effectively implement their long-range plans, the districts we profiled have created diverse mechanisms for ongoing collaboration among district curriculum directors and coordinators of state and federal funds. In Norwich Public Schools, a small K–8 district, the Mathematics Consultant and the Curriculum Director first review test data to identify professional development needs and then map out the resources available to implement staff-development programs. In larger districts, more complex mechanisms have evolved for the coordination of district-level resources.

> In Memphis, the Coordinating Council for Professional Development is the chief mechanism by which professional-development efforts are coordinated. Members include representatives from the offices of School Redesign, Standards and Accountability, Compensatory Education, and the Memphis Urban Systemic Initiative. They meet weekly to keep one another informed about their respective activities, to avoid unnecessary duplication of efforts, and to collaborate on the development and funding of special projects.

> In San Francisco, [illegible]rticulation Council meets monthly to share information about funding and pro[illegible]s and to coordinate strategies for keeping the district and schools focused on standards-based instruction in mathematics and other subjects. The Interdepartmental Team, with overlapping membership in the Articulation Council, is a more specialized group that also meets once a month to coordinate resources and activities in service of low-performing schools.

As noted earlier in this report, many districts have embraced site-based decision making as a school management tool. In fact, all the districts that we profiled use some form of school-based management to determine (consistent with appropriate guidelines and regulations) how much money from each source (e.g., district operating funds, Title I money, etc.) will be used for mathematics education and how it will be used. In this way, schools are establishing processes and mechanisms similar to those at the district level to make decisions about program planning and the consolidation of resources to support high-quality mathematics education.

> In Norwich, Building Instructional Teams at each school coordinate funds and promote standards-based instruction. The team-planning process includes a systematic annual review of state test data from the previous year to stimulate a discussion of needs, priorities, and strategies. As part of the decision-making process, the Building Instructional Team completes a matrix that describes needs; resources available from Title I and other sources; and a Plan of Action, including specific strategies for directing the resources toward the identified needs. Action plans must focus on improving the achievement of all students.

> In the Ysleta Independent School District, resource coordination is the province of Campus Educational Improvement Councils. These councils typically advise principals on matters relating to the school budget, staff development, personnel, curriculum, and facilities. Their areas of influence include the interpretation of needs-assessment data (including student performance on the statewide assessment) and the subsequent allocation of Title I and other resources to address identified needs. The Campus Educational Improvement Councils also approve each school's annual Campus Action Plan and review the plans and results periodically to ensure effective implementation.

Supporting School Change

With the increased incidence of school-based management as a strategy for building-level decision making, schools have more autonomy and more responsibility for achieving results. Site-based decision making, long-range planning, resource coordination, the selection and implementation of standards-based curriculum—managing all of these is a tough job, and schools need a great deal of support in order to carry out these functions effectively.

Districts are monitoring site-based decisions to ensure that they are consistent with district standards and that they result in high-quality teaching and learning outcomes in the classroom. To varying degrees, decentralized school districts provide ongoing technical assistance to schools so that they are clear about what high-quality, standards-based mathematics looks like and how to achieve it.

> Norwich and Traverse City are small districts that rely on one or two district mathematics content specialists to provide this kind of ongoing technical assistance. In Norwich, Title I and Title II funds were pooled to hire a mathematics supervisor. In Traverse City, a combination of Title I and local district funds was used to hire a second mathematics specialist for the district.
>
> Memphis, San Francisco, and Ysleta have cadres of full-time released teachers (known as Teachers on Special Assignment or Mentor Teachers) in addition to networks of school-based lead teachers to help schools and teachers implement standards-based curriculum programs in mathematics.

To further reinforce expectations, districts are establishing systematic procedures for monitoring progress and providing formative feedback related to the implementation of standards-based mathematics programs.

> Through Memphis's Instructional Accountability Initiative, central office staff are trained to conduct schoolwide observations and provide written feedback to principals about the implementation of standards in all core subjects. Each school is visited five times a year, each time by someone from a different district office, to provide principals with formative feedback and to reinforce their understanding of what it means to implement high academic standards.

Other kinds of support identified in our initial district interviews include developing district assessments for diagnostic use, training principals to use data to identify needs and monitor progress, providing leadership training for school-based management teams, and providing professional development around the implementation of standards.

Sustaining School Improvement

To bolster commitment to standards-based mathematics education and maintain momentum for improvement in the schools, local education agencies are examining how policies and practices support or obstruct the achievement of the district vision for mathematics. Where necessary, policy and practice are being realigned to facilitate and support standards-based mathematics education programs.

The most commonly reported types of policy change follow:

- Alignment of local curriculum with new state frameworks and assessments
- Development of new assessments that better reflect specific district standards for mathematics achievement
- Centralized adoption of standards-based curriculum materials or the piloting of such materials in anticipation of an upcoming adoption cycle
- Elimination of low-level mathematics courses and an increase in mathematics credits required for high school graduation

School accountability is a policy tool that is used to encourage ongoing attention to excellence and improvement in mathematics education. Where the locus of control has shifted to the building level, districts are holding schools accountable for improved student performance on state and district measures of mathematics achievement. Some districts are even providing financial incentives to teachers and schools to encourage them and reward them for continued or sustained improvement.

> Like all Texas schools, schools in the Ysleta Independent School District receive an annual accountability rating, which is based on the academic performance of the lowest performing student group (Hispanic, African American, Anglo, and low income). The ratings are published in the local media, and schools work hard to achieve and maintain "Recognized" and "Exemplary" status.
>
> In Memphis, the chief vehicle for maintaining school accountability is the Principal Performance Effectiveness Program. Every three years, panels of central office staff and principals from other districts review four types of school performance indicators: quality of the school improvement plan, principal efficacy, positive school climate, and growth in student achievement.

Through policy alignment and school accountability, districts ensure that although individual schools tailor strategies to suit their unique circumstances, all their efforts contribute to the attainment of the same high standards by all students.

In this section of the report, we have presented the four phases as distinct stages in the planning and implementation process, with visioning, supporting, and sustaining activities providing the necessary supportive context for effective resource coordination. Figure 1, "Comprehensive Resource Coordination," depicts an idealized cycle of activity. Perhaps only in the early planning stages is it useful to think of these phases separately—to ensure that all bases are covered. For in practice, all four phases are ongoing, dynamic, and overlapping—as the district profiles illustrate.

The five district profiles are compiled in appendix B of this report. In each profile, strategies for resource coordination are described in the context of the district's mathematics education program. Each profile is followed by two examples of how the coordination of resources to support standards-based mathematics plays out at the school level.

The ultimate purpose of this project was to identify and share good, instructive examples of how districts are coordinating resources to support mathematics improvement efforts. The districts profiled in this report have made significant progress along these lines and are beginning to see results in terms of student achievement gains. Their stories are presented here in hopes that the strategies and mechanisms that they have evolved to this point can give other districts a head start in devising similar means that suit their own contexts.

Appendix A
Districts Interviewed in Research Phase I

Baltimore (Maryland) City Public Schools

Clark County (Las Vegas, Nevada) School District

Columbus (Ohio) Public Schools

Corpus Christi (Texas) Independent School District

Culver City (California) Unified School District

Elizabeth City-Pasquotank (North Carolina) Public Schools

Guilford County (Greensboro, North Carolina) Schools

Kirkwood (Missouri) School District

Memphis (Tennessee) City Schools

New York City (New York) District 2

Norwich (Connecticut) Public Schools

Peoria (Illinois) Public Schools

Pittsburgh (Pennsylvania) Public Schools

San Francisco (California) Unified School District

Traverse City (Michigan) Area Public Schools

Waltham (Massachusetts) Public Schools

Ysleta (El Paso, Texas) Independent School District

Appendix B
Districts Profiled in Research Phase II

Memphis (Tennessee) City Schools

Norwich (Connecticut) Public Schools

San Francisco (California) Unified School District

Traverse City (Michigan) Area Public Schools

Ysleta (El Paso, Texas) Independent School District

Memphis City Schools

In Memphis City Schools, the coordination of resources to support high-quality mathematics instruction is made possible by (1) the district's commitment to achieving high academic standards and (2) organizational structures that facilitate collaboration between district offices, between schools, and across levels of the school system.

Memphis has made a considerable investment in providing support for the implementation of high standards in mathematics. The Memphis Urban Systemic Initiative provided the resources for several district-level mathematics "teachers on assignment" as well as a mathematics lead teacher in every school. In all schoolwide Title I programs, instructional facilitators make sure that teachers have adequate instructional materials and staff development to provide quality instruction in mathematics. Through the district's Instructional Accountability Initiative, every principal receives feedback several times a year on the state of his or her school's standards-based instructional program. High standards are also reinforced through the district's accountability system, which includes school performance objectives for student achievement in mathematics.

The district has also crafted a number of mechanisms for bringing people together to work through the challenges of standards-based instruction. At the school level, site-based decision-making teams (comprising the principal, faculty members, parents, and community representatives) use student performance data and teacher input to decide how to use Title I and other district resources to strengthen mathematics programs. Principals meet monthly in geographic clusters to focus on the instructional issues related to implementing standards. And a district-level committee of federal program and curriculum coordinators meets regularly to share ideas, identify common professional development needs, and investigate opportunities for joint programs.

Another factor contributing to progress in Memphis is time. The current level of coordination in Memphis did not happen all at once. The district has been working out coordination issues in stages for the past four years; each year the necessary structures and processes are refined a little more. Reflecting on how far the district has come, the superintendent pointed out a valuable lesson for districts who want to take a similar path: "It takes a lot of time to think you could have student success, to change the culture of an organization, because people don't believe it can happen. You have to stay long enough to make them believe."

The case description of Memphis City Schools is followed by two examples of how the coordination of resources to support standards-based mathematics education plays out at the school level.

The District

Of the nearly 114 000 students enrolled in the 162 Memphis City Schools, 82 percent are nonwhite (mostly African American) and 59 percent participate in the federal lunch program. The so-called white-flight academies, which opened in Memphis at the time of desegregation, are now closed. However, a number of private and religious schools remain; about 25 000 school-age children are enrolled in independent schools.

Superintendent Gerry House came to Memphis seven years ago from a much smaller district in North Carolina. One of the things that most distinguishes her tenure as the Memphis City school chief is the gradual and steady phasing in of reform programs. Each new phase builds on lessons learned so far and continually aims at the district's mission, which is

> To prepare all children to be successful citizens and workers in the 21st century. This includes educating them to read with comprehension; write clearly; compute accurately; think; reason; and use information to solve problems.

The mission statement and related goals grew out of a mammoth communitywide effort. With the help of an external facilitator who had strategic-planning expertise, focus group discussions were held throughout the community to solicit input from parents, business people, the Board of Education, and central office staff. The external consultant then worked with district administrators to translate broad community consensus into strategic-planning goals and lifelong-learning standards. With these goals and standards to guide them, the superintendent and her executive staff developed a districtwide action plan and performance indicators, which the Memphis City Board of Education subsequently approved.

A central component of the district's action plan has been the implementation and support of whole-school reform strategies. During the 1994–95 school year, interested schools were invited to attend a Design Expo, which featured presentations and exhibits for a number of New American Schools models. Thirty-five schools volunteered to pilot whole-school reform that year. In subsequent years, staff from these schools have become spokespersons for the models they use. Other schools in search of a model visit them as part of the process of choosing the model that best suits that school's administration, faculty, and student population. A new cohort of schools has joined the whole-school reform movement each year. As of the 1998–99 school year, each of the 162 schools in Memphis has adopted a school-reform model of its own choosing.

More than a dozen models are currently in use, including six New American Schools models (ATLAS, Audrey Cohen College, Co-NECT, Expeditionary Learning Outward Bound, Modern Red Schoolhouse, Roots and Wings), as well as reform models from the National Paideia Center and the Accelerated Schools Project. Some models come with their own standards, but these are implemented in tandem with Tennessee's state curriculum standards. The models vary in terms of being content- versus process-focused. However, the design models are not intended to be stand-alone programs; rather the district is adamant that the models simply provide a *strategy* for achieving higher academic standards. No matter what model it chooses, each school is still accountable for achieving the same high standards and for improving performance on the Tennessee Comprehensive Assessment Program (TCAP), a norm-referenced test.

Early evidence shows that redesign schools are up to the challenge. A study released by the University of Memphis found that the first twenty-five elementary redesign schools, initially among the lowest performing schools in the district when whole-school design models were introduced during the 1995–96 school year, outscored all other elementary schools in the district in 1998 in all five tested subjects, including mathematics.

Technical assistance for achieving high standards through whole-school reform strategies is provided by the district. Design specialists in the Office of School Reform facilitate the implementation of specific designs and coordinate networks of schools that are using the same model. They also use the lessons learned from implementing schools to identify professional-development needs and plan the appropriate programs to address those needs.

The Mathematics Program

Because of its importance as a "gatekeeper—especially for children of color and poor children"—and its relevance for employment, mathematics education (along with science edu-

cation) has been one of the main levers for school reform in the Memphis City Schools. According to the superintendent, improving the mathematics program has been "both an equity and an excellence challenge—getting more kids to take higher-level math courses and eliminating the lower-level courses."

In 1994, Memphis City Schools successfully competed for a National Science Foundation (NSF) Urban Systemic Initiative (USI) award. Combining NSF funds and other federal funds, the Memphis USI is the "backbone" of the district's mathematics reform program, providing direction for reform efforts and supporting schools to accelerate higher-level course taking in the district. All Memphis schools are held accountable for achieving the USI goals and objectives for mathematics.

Now beginning the fourth year of district mathematics improvement, Superintendent House is most proud of three things:

> One is the courage of the Board of Education to adopt policies that created equity by eliminating lower-level math courses. Then there's the amount of assistance that is given to teachers, the professional development. There's a lot of it for teachers. Third is the safety net activities that the USI staff have been providing for students.

Along with the decision to eliminate all general mathematics courses at the middle and high school levels, the Board also voted to require ninth-grade students to take Algebra I. Therefore, Pre-Algebra is now taught in grades 7 and 8. Through the USI, the district provides a great deal of assistance to teachers to ensure high-quality preparation of students for Algebra and higher-level mathematics courses. Said House, "In the past we have had very few students taking Calculus, Algebra II, and Trigonometry. Our children can learn, and our teachers can teach it."

The district's mathematics infrastructure consists of a Mathematics Facilitator and ten USI Teachers on Assignment, who are responsible for professional development in elementary or secondary mathematics. To further support mathematics-improvement efforts, the district has identified a mathematics lead teacher in every school in the district. These lead teachers receive extensive professional development from the Mathematics Facilitator and the Teachers on Assignment. Lead teachers, in turn, share what they have learned with the other mathematics teachers at their home schools.

The Teachers on Assignment are also instrumental in providing a variety of "safety net" programs directly to students. The largest of these programs is the Saturday Academy. During the school year, all seventh and eighth graders are invited to participate in six Saturday sessions each semester. The purpose of the program is to enhance students' mathematics (and science) skills and to make sure that they understand the district's graduation requirements and college entry requirements. In the summer, USI staff offer an Algebra Camp for rising high school freshmen who are going to be taking Algebra in the next year. Said Mathematics Facilitator Joan Cox, "It's primarily Algebra with the focus on motivation and helping them understand the big ideas of Algebra and eliminating the kind of fear a lot of students have around it."

Until recently, the assessment of mathematics performance in Memphis City Schools was accomplished largely through the Tennessee Comprehensive Assessment Program (TCAP). The TCAP is a traditional, norm-referenced, multiple-choice test that is administered to all students every year in grades 3–8 and 10. In 1998–99, the state augmented its testing program by supplementing the TCAP with items from the Terra Nova assessment program. Although the Terra Nova also uses a multiple-choice format, individual items require students to use problem-solving and critical-thinking skills. In the meantime, the district has also begun to develop performance assessments that reflect the state standards. An assessment clearinghouse has been created to maintain banks of items for all four core subject areas. Some of these performance assessment items were administered on a pilot basis in the spring of 1998.

In anticipation of the next central adoption of textbooks for mathematics, district personnel have been recruiting and supporting schools to pilot standards-based materials, as well

as building their own professional development offerings around these materials. On the basis of available research and the experience of other districts, the USI chose to support the use of *Everyday Mathematics* and *Investigations in Numbers, Data, and Space* at the elementary level; the middle schools involved in the textbook pilot program are using either *Connected Mathematics* or *Mathematics in Context*. At the high school level, USI staff are supporting the implementation of *College Preparatory Mathematics* and the Pacesetter pre-Calculus curriculum; however, they are still looking at other options for secondary mathematics.

USI staff are also partners in the districtwide implementation of whole-school reform strategies. According to USI Director Marieta Harris:

> That's the greatest challenge that we've had. How do we help those who are responsible for [implementing the reform model], particularly the principal who is the instructional leader, to know and understand that because he/she has a particular model, that there's still a responsibility for the math/science reform within that model. That math/science reform is not isolated from the model. It's part of the implementation of the model and it's part of the district reform. We don't want principals to see reform as doing USI here and doing New American there, whatever the model may be, and then doing standards tomorrow. You do standards, you do USI, you implement your model, and it's all one piece.

Coordination of Resources

The Memphis City Schools use NSF/USI, Title II, and Title VI funds to support mathematics improvement in the district. USI staff have also written some Goals 2000 grant proposals to the state to obtain resources for expanded professional development. In addition to policy alignment and teacher professional development, one of the district's significant strategies for improving mathematics education is resource coordination, which the USI models in the way programs are funded. Said USI Director Harris:

> For example, if we're going to implement the Saturday Academy, then we tap into USI dollars. We also tap into Eisenhower and Title VI funds. We use the Eisenhower dollars to train the teachers who are going to conduct the Saturday Academy. We use the USI dollars to pay their Saturday Academy stipends. We would use the Title VI funding to purchase resources for the students—to pay for the buses, to pay for snacks, and that kind of thing. So it's really a reallocation of the dollars, combining funding sources.

Title I also provides funding and support for mathematics, and it does so on a much larger scale than the USI or any other federal program. Most of the district's Title I allocation (85 to 90 percent) is distributed to schoolwide Title I schools. The district's policy is to allocate Title I funds only to schools that qualify with at least 75 percent of students on free and reduced-price lunch.

Nearly two-thirds of Memphis City Schools (101 out of 162) qualify for schoolwide assistance at the 75 percent level. In addition to allocating Title I funds only to these high-need schools, the district has chosen to "spiral the money downward" among them. Schools where all students qualify receive $700 for each student, with the per-pupil allocation decreasing to as low as $350 in schools where 75 percent of students qualify.

Each of the district's Title I schools has used its funds to hire an instructional facilitator, who functions as the school's "curriculum leader." The instructional facilitator is responsible for "assisting teachers in any way needed." Usually this means identifying and ordering instructional materials and demonstrating instructional strategies. Instructional facilitators also do one-on-one tutoring with students.

To further support Title I schools, the district holds monthly meetings for all Title I instructional facilitators. The purpose of the meetings is to keep them apprised of updates in Title I

regulations, to allow publishers to make presentations on reading or mathematics strategies, and to offer the instructional facilitators whatever professional development they feel the teachers at their schools need most. Every meeting ends with a review and an update of current staff-development priorities to effectively plan future meetings.

In addition to paying for the salary and professional development of the instructional facilitator, Title I funds are used by schools to purchase and upgrade technology, to operate and maintain technology in labs and classrooms, to purchase instructional software for reading and mathematics, to have staff attend professional-development activities related to the implementation of whole-school reform models, to purchase hands-on instructional materials for mathematics, and to operate extended-day programs.

Through a combination of site-based management, school accountability, principal support, schoolwide observations of instruction, and district-level resource coordination, Memphis City Schools strives to use all its resources to support standards-based instruction in mathematics and other subjects. The district also gives teachers and administrators access to the technical assistance and professional development they need to effectively engage in standards-based mathematics education in the context of whole-school reform. And because the USI's goals and objectives for course taking and student achievement in mathematics have been adopted by the district, attention to resource coordination to support mathematics improvement is almost ensured.

Site-Based Management

The state has granted schools the autonomy to select whole-school reform models and to decide how their school budgets (including their Title I allocation) will be used to support the achievement of high academic standards. And though there is a central district textbook adoption, schools can apply for "accountability waivers" to use whatever materials they want as long as they have a research-based rationale for doing so. At the same time, the state and the district hold each school accountable for achieving the state standards.

Every school in the Memphis district elects a School Leadership Council, which is the primary site-based decision-making team. The Leadership Council must include teachers, parents, and other community representatives. The formal selection of whole-school reform models was made with the approval of the Leadership Council, which is also responsible for approving the school budget and the School Improvement Plan each year.

Once cleared by the School Leadership Council and the faculty, the School Improvement Plan is submitted to the district's Office of Accountability, which assembles a panel to review plans in light of the district's goals and objectives for mathematics and other subjects.

School Accountability

Every three years, a school's School Improvement Plan undergoes a rigorous external review as an essential part of the state's Principal Performance Evaluation Program (PPEP). Though ostensibly focused on principals, PPEP is currently the mechanism by which schools are held accountable for improvement. Principals are evaluated through PPEP on a three-year cycle, with a third of all principals being evaluated each year. The program tracks four kinds of school performance indicators: quality of the School Improvement Plan, principal efficacy, positive school climate, and growth in student achievement.

To measure change in student achievement, the state uses the Tennessee Value-Added Assessment System (TVAAS) to establish target growth rates for every school. Growth measures are calculated for mathematics and other subjects by using the school's history of performance on the Tennessee Comprehensive Assessment Program (TCAP). The district augments this component of the PPEP by comparing student performance with minimum "absolute standards" (e.g., a specific proportion of students scoring above the 50th percentile).

Principal Clusters

Because strong instructional leadership and a deep understanding of academic standards and how to implement them are believed to be integral to school success, the district has devised a couple of mechanisms for reinforcing principals' working knowledge of the state standards. One of these mechanisms is the "principal cluster" through which ongoing discussions of standards-based instructional issues take place.

Principals are clustered for the most part by K–12 feeder patterns. The district has twelve clusters, and each one typically involves twelve to fourteen principals. Each cluster elects a cluster leader who is responsible for facilitating the four-hour, monthly cluster meetings. All cluster leaders have received professional development to help them effectively steer discussions away from day-to-day operations and keep the focus on teaching and learning. At these meetings, principals are encouraged to present results and use data to talk about what is happening in their schools.

The cluster leaders meet monthly as a group with the superintendent and her executive staff. Said Superintendent House, "They flow things up that may be disruptive to their ability to implement quality teaching and learning." The superintendent's original purpose for organizing principals into clusters was to "flatten the bureaucracy" and simulate the kind of daily contact she had with principals when she was in a much smaller district. One benefit of this structure has been to facilitate a shared understanding among instructional leaders of what it means to promote high academic standards.

Instructional Accountability Initiative

Another mechanism for reinforcing principals' understanding of what it means to implement high academic standards in all subjects, including mathematics, is the district's Instructional Accountability Initiative (IAI). The purpose of the IAI is to give principals an objective, third-party assessment of the quality of instruction that is taking place in their schools.

The IAI is a collaboration among five district offices: School Redesign, Standards and Accountability, Memphis USI, Compensatory Education, and Technology and Careers. Mid-level administrators in each office have been trained to conduct schoolwide observations of instruction and school climate. Indicators of quality instruction include teacher facilitation, student engagement, and instructional uses of technology. Quality indicators for school climate include high expectations for students, student work that reflects high academic standards, and a climate of respect for students. To increase the likelihood that these criteria are consistently understood and applied, observers in the collaborating offices undergo joint professional development.

School visits are unannounced and usually take a full day to complete. Observations are summarized in a letter to the principal and are intended to help principals monitor and improve the implementation of whole-school reform models to support standards-based instruction. There are no "high stakes" uses of the results by the district.

Coordinating Council for Professional Development

The offices that collaborate on the Instructional Accountability Initiative (School Redesign, Standards and Accountability, Memphis USI, Compensatory Education, and Technology and Careers) have some responsibility for providing professional development related directly and indirectly to standards-based instruction. For the past few years, the directors of these offices have met monthly as the Coordinating Council for Professional Development. Among these directors are the district's coordinators of Title I, Eisenhower, and Perkins funds.

Originally the group was formed to keep one another better informed of their respective activities and to avoid unnecessary duplication of professional-development programs. In the process (by design), they have forged stronger relationships, which have led to increased

collaboration. Said one member: "In the past, we worked together as we needed things or as we knew people. Now we know each other better. There's more mixing and mingling among us and our programs."

The current Memphis USI budget offers some examples of the kinds of district- and school-level collaborations that have resulted from the Council's efforts to coordinate resources in support of standards-based mathematics instruction:

- Every school receives an allocation from the USI to facilitate achievement of the district's/USI's goals and objectives for mathematics and science. In schoolwide programs, this money is combined with Title I funds to expand the school's capacity to provide high-quality mathematics instruction.
- An additional amount is being allocated to clusters of schools that have adopted the same design model. The money is being made available to encourage these schools to collaborate in exploring ways to strengthen their respective mathematics programs through their common design model.
- A new USI Teacher on Assignment is being assigned to the Office of Standards to help develop performance-assessment items for mathematics and science. These items will become part of the district's performance-assessment clearinghouse.

Alton Elementary School

Alton Elementary School serves approximately 660 students in grades K–4. One hundred percent of students are African American, and virtually all of them (96 percent) receive free or reduced-price lunches. The student population is quite mobile within the district, and the student body decreases by about 20 percent from initial fall enrollments to the end of school each year.

The school is beginning its fourth year of implementing Co-NECT, one of the New American Schools reform models. The principal explained that her school chose to implement Co-NECT because the model "seemed to embrace all the tenets of good practices that we thought we could reasonably embrace without considering it an add-on to what we were doing every day—it blended with what we thought we ought to be doing anyway." The Co-NECT model integrates technology into project-based teaching and learning. Said the principal: "You teach from projects. You have a regimen. You are free to create, borrow from whatever you want to do. The children seem to learn from this. But we also wanted to be able to use our computers in instruction. We didn't just want to have them sitting there. So when we examined all the models, this one seemed to be technology-based but still promoting instruction." To reinforce the skills needed to successfully do the project work, teachers set aside 45 to 60 minutes a day for "seminar time." During this period, students are temporarily regrouped by ability for multiage mathematics instruction.

In accordance with the Co-NECT model, teachers are organized into five clusters, one for kindergarten and two each for grades 1/2 and 3/4. Each cluster elects a chairperson and meets weekly to collaborate in planning projects. As a group, the five cluster chairs constitute the school's Co-NECT Design Team. Together with the principal, the chair of the School Leadership Council, the guidance counselor, and the Title I Instructional Facilitator, the Design Team is responsible for developing the School Improvement Plan and for allocating Title I and other district funds to support instructional programs. The group uses test data, teacher input, and members' own observations to plan an instructional program that will enable students to achieve the state standards.

Title I is an important resource for implementing the Co-NECT model in support of high academic standards at Alton Elementary. About half of the school's Title I allocation is used for improving mathematics instruction. With its Title I money, the school has purchased manipulatives for use in class projects, centers, and performance assessments. The school's

computers have been upgraded with Internet access to aid students in their project work. Title I has also been used to acquire instructional software for mathematics. When the district administered the Terra Nova mathematics assessment for the first time to third and fourth graders (spring 1998), the school purchased the test for its second graders as well; the results are being used diagnostically to plan this year's third-grade mathematics program. Title I also pays for a great deal of staff development to support the implementation of the Co-NECT model. Teachers have visited other Co-NECT schools outside of Memphis; they also meet regularly with the other seven Co-NECT schools in the district to help one another see how "to make everything that we're doing work for us to achieve district and state expectations for reading and math."

Vance Middle School

Vance Middle School enrolls about 450 African American students from the surrounding housing projects. The principal describes the school as having "all of the problems of other inner-city schools," including low parent involvement, many students who perform below grade level, and extreme economic disadvantages. Every student at Vance is on free lunch. Some students will not start the school year on time because their parents are waiting for AFDC checks to buy them school clothes. As the principal put it: "Basically, our students have real-life problems."

In spite of these challenges, the principal is determined that his students will be held to consistently high academic standards. He explained with conviction: "We're not lowering the standards. We're an inner-city school. Some of our kids come to us over-age, not on grade level. That doesn't stop us.... We keep the standards high, and we try to build the student up to meet the standards."

The theme of setting high expectations for all students is integral to the Modern Red Schoolhouse reform model, which Vance Middle adopted four years ago. The model is founded on the principle that all students "can and will reach high academic standards." The Modern Red Schoolhouse model comes with its own set of high standards for each core subject area, and the Title I instructional facilitator (with the help of the guidance counselor and two other teachers) is responsible for cross-referencing these standards with the Tennessee state standards.

Decisions about how to use Title I funds at Vance Middle School are data-driven. Starting in the spring, the School Leadership Council meets with department chairs and grade-level team leaders to get an idea of how students are performing relative to Modern Red Schoolhouse and state standards. At this time, teachers also make recommendations for improving school programs on the basis of their knowledge of the students, including results of in-class assessments. The Leadership Council uses this information to plan the school's instructional priorities and budget for the coming year. When the results of the Tennessee Comprehensive Assessment Program and Terra Nova assessments are released in August, the Leadership Council analyzes them to validate their plans. Each year, about half of the school's Title I budget allocation is used to support mathematics instruction.

To implement the Modern Red Schoolhouse model well, students and teachers use a variety of tools. At Vance Middle, a great deal of the Title I budget is used to purchase, upgrade, and maintain technology—including instructional software for mathematics, computer work stations for teachers and students, a network infrastructure, and Internet access. Title I also pays the salary of the computer technician who operates the school's computer labs for mathematics and reading instruction.

Other uses of Title I include staff development related to the Modern Red Schoolhouse model, a mathematics/reading tutor, and instructional materials (textbooks and manipulatives) to support several new enrichment courses, including Algebra and Honors Math.

Norwich Public Schools

At every level of decision making in Norwich, actions are driven by content and achievement standards, as measured by the Connecticut Mastery Test. District and school strategies for improving mathematics reflect a philosophy grounded in high expectations, inclusion, and a team model that uses complementary staff for meeting the needs of all students. The Mathematics Consultant, supported by Titles I and II, plays a central role in promoting standards-based mathematics; interacting closely with both district and school staff; and working with teachers, special education staff, and interns who assist in regular classrooms and after-school sessions for targeted students who fall below CMT goals.

Decisions about the use and coordination of funds in support of mathematics improvements are made at the building level in Norwich. CMT scores drive the decision-making process used by Building Instructional Teams, although other school assessment data and teacher evaluations also enter into the equation. Action plans submitted to the district each year match needs to available resources and describe planned activities to address school goals. Improved performance for all students guide the use of Title I funds, which are typically used to pay salaries for after-school staff who work with remedial and "almost there" students.

Although schools decide how to use Title I funds, the district remains accountable for ensuring that funds are used appropriately. Since the Building Instructional Team model was initiated a decade ago, district personnel have worked to increase the capacity of school decision makers to use funds well and to provide high-quality mathematics instruction. Still, reading and writing remain primary areas of emphasis in the district, and with limited resources to draw on locally, the district relies heavily on external funds to support instructional improvements in mathematics. And although many elementary and middle school teachers need further support in implementing standards-based instruction, the Mathematics Consultant is already "spread thin" in her work. Despite these barriers, Norwich has steadily improved student performance in mathematics and has enhanced students' chances of pursuing this subject successfully in middle school and beyond.

The District

The Norwich Public Schools serve about 4 200 students in grades K–8 only. Twenty-seven percent of the students are minority, primarily African American and Hispanic; 44 percent are eligible for free or reduced-price lunch. There are ten elementary schools and two middle schools that include grades 7 and 8 in Norwich. Both middle schools and eight of the elementary schools receive Title I funds; five of the eight elementary schools have schoolwide Title I programs. The high school—Norwich Free Academy—is a "quasi-public-private" institution governed by its own Board of Trustees; the district budget includes tuition costs for Norwich students who attend. The arrangement leaves the Norwich Board of Education with no control over curriculum and instruction in grades 9–12, and historically, relations

have been "strained" between the district and Norwich Free Academy. A new superintendent, however, has set in motion strategies for improving communication and articulation across grade levels. For example, middle schools meet with high school department chairs several times a year and "red flag" incoming students in need of extra attention. Articulation is far more likely to occur between elementary and middle schools, however, where sixth-grade teachers participate in middle school planning sessions.

The district administration is a "lean operation" consisting of Superintendent Michael Frechette; the Director of Curriculum, Instruction, Testing/Evaluation, and Grants Development; the Director of Pupil Personnel Services, who administers special education funds and supervises related staff; and a business administrator. The Superintendent of Norwich is entering his second year in the system. His priorities include early childhood education and family support services; improved relations between the city and the school system; restructured middle schools to include sixth grade by the 2000–2001 school year; and data-driven instructional improvements that maintain and "take to the next level" high achievement scores among Norwich students. Although mathematics is considered one of the core subjects and a key area for improvement, reading and writing take precedence in both district and school budgets.

Central office staff also include Curriculum Specialists for mathematics, science, and language arts. Known as Consultants, these persons hold teacher rank, are released full time, and work in the schools as coaches and facilitators of change. Typically, the Consultants have a wide array of responsibilities and are "spread thin" in their efforts. In addition to working with district staff on planning and implementation issues, the Mathematics Consultant works with elementary and middle school personnel to increase their awareness of high-quality materials and best practices in mathematics.

According to the Director of Curriculum, the district's greatest need in mathematics is convincing people that "all kids can learn at high levels." The process for accomplishing this goal has included a "community conversation" in support of school readiness, focused on children ages 0–8. With financial support and technical assistance from a private foundation, Norwich assembled a group of leaders representing the city, the school system, child-care services, and social services.

Over the last four years, the group has convened four times annually to make policy and budget decisions that foster student preparedness. The group has also sponsored districtwide education forums to engage the public in the discussion and to educate them about standards-based instruction. Although not specifically focused on mathematics, the group has embraced a philosophy that school readiness is crucial to high achievement in core subjects. Raising expectations for all children in the community continues to be a major challenge, however. One community member who attends budget hearings reiterates the same message every year: "I don't know why they expect to teach these advanced classes at our schools. We have children who can't absorb this advanced stuff." According to the Curriculum Director, this person "represents a substantial body of thought in this community." School and district personnel persist in their efforts to establish a norm of high expectations for all students and "to change the culture of schools" to allow these beliefs to take root.

There is progress. As a result of collaborative community discussions, people from schools and agencies have begun to set aside turf issues and work together on facilities and staffing for before- and after-school child care, Head Start, and other early childhood initiatives. The city has also increased its support for education. As the Superintendent said, "If we were to be held accountable for high test scores, then we needed the tools to do it." The city council responded: local funds for professional development jumped from $4 000 last year to $50 000 in the current budget. The community has also sanctioned support for schools by passing an $11.5 million bond for school renovations, expansion, and computer technology.

The Mathematics Program

State content and achievement standards, as measured by the Connecticut Mastery Test (CMT), have provided the push for improvements in K–8 mathematics. Developed in 1985 and revised in 1993, the documents reflect national standards and best practices in mathematics. The CMT, administered in grades 4, 6, and 8, is criterion-referenced; mathematics questions require that students apply problem-solving and reasoning skills and provide written justification for their responses. The state also offers districts an optional "off-year" CMT for grades 3, 5, and 7 to help schools assess instructional needs and target students in need of assistance.

Over the last decade, the district has deliberately set about raising expectations and performance in mathematics. According to the Curriculum Director, Norwich "took the CMT seriously" from the beginning and looked for ways to align its curriculum with the tested objectives. It has been a longstanding practice among Norwich superintendents to push school personnel to move beyond "myth and rumor" and to use data to drive improvements in mathematics instruction.

The district's efforts are paying off. Since 1985, mathematics scores on the Connecticut Mastery Test have improved greatly at all grade levels and at a rate higher than those for the state and for towns that are economically and demographically similar to Norwich. Gaps between minority and nonminority students have also diminished. In Connecticut, where CMT results receive prominent media attention, Norwich test scores have been a source of community pride, particularly in light of its status as a low-wealth district. There are other signs of improvement in mathematics as well. The number of students enrolled in algebra by grade 8 has increased from 30 percent to 70 percent in the last ten years, and tracking in mathematics has been eliminated in one middle school and reduced in the other.

The core program, materials, and instructional strategies for mathematics are established centrally by a committee of teachers and central office staff. There is no time line for the adoption of new materials. As one administrator said, "The process is never 'finished.' We're always looking at new materials." For example, in response to a slowed rate of improvement on CMT scores over the last several years, Norwich is reassessing the use of Addison Wesley textbooks at the elementary level. To guide the selection process, the district committee first developed a set of standards-based criteria. Using these criteria, the committee selected *Growing with Mathematics* (Mimosa Publishing) and *Everyday Mathematics* (Everyday Learning Corporation) to pilot during the 1998–99 school year. The district's Mathematics Consultant will hold follow-up meetings throughout the year to compare how these materials stack up in practice against the standards-based criteria. On the basis of these discussions, the selection committee will choose which series to adopt.

The district anticipates a similar process in adopting new texts in grades 3–6, where an Addison Wesley series is now used, and in the middle school when restructuring is complete. Grades 7 and 8 in Norwich now use the University of Chicago School of Mathematics program.[1] The district also encourages staff to use supplemental materials. For example, district efforts to integrate mathematics and science have resulted in the use of materials from the Great Explorations in Math and Science (GEMS) program. The project grew out of a pilot program funded by the Connecticut Academy for Mathematics, Science, and Technology, which was the recipient of an SSI grant from NSF.

The Mathematics Consultant

In addition to supervising the selection and adoption of instructional materials, the Mathematics Consultant provides leadership and support for implementing standards-

[1] Grades 9–12 at Norwich Free Academy use the high school component of the University of Chicago program.

based mathematics in the district. For example, principals evaluate teachers, but the Mathematics Consultant is the "tool" for coaching and helping teachers improve classroom practices. Using the results of their evaluation, teachers design their own professional-development program and evaluation criteria. The Mathematics Consultant intervenes in a variety of ways to help teachers meet their personal professional-development goals; her methods include one-on-one coaching, classroom demonstrations, in-service sessions, and other forms of ongoing instructional support.

The Mathematics Consultant is a crucial player in other ways as well. Her responsibilities include reviewing test scores with the Curriculum Director to identify trends and professional-development needs; working with Building Instructional Teams to review CMT scores and school data and to design strategies to meet needs; doing presentations at faculty and PTO meetings to increase awareness of standards-based mathematics education; searching out resources to augment the mathematics program; and working with new teachers—as often as once a week during the year—to increase awareness of standards-based instruction. The Mathematics Consultant has also developed authentic assessments for teachers to use in grades 2, 3, 5, and 6. Based on CMT objectives for each of these grade levels, the instruments are designed to help teachers profile each student's progress toward meeting objectives and adjust instructional strategies accordingly.

Although the Mathematics Consultant visits all the elementary and middle schools in Norwich, making herself visible and accessible as a resource to both administrators and teachers, she focuses her time on grades with the highest demonstrated need for improvement in mathematics. For example, since 1993, gains on the CMT have been less substantial, particularly in the middle grades, which has led district leaders to target the efforts of the Mathematics Consultant at this level. In addition, primary-grades teachers continue to "think of themselves as reading teachers generally," which has prompted the Curriculum Director to direct the efforts of the Mathematics Consultant at the K–2 level where teachers will pilot new materials in the 1998–99 school year.

Coordination of Resources

Norwich uses a combination of local, state, federal, and private funds to support the district's mathematics program. State and local funds total about $47 million; about 35 percent of these funds support mathematics, primarily through teacher salaries. Given its low-wealth status, and the emphasis on reading and language arts, the district typically depends on federal funds (Titles I, II, IV, and VI; IDEA; Perkins; and the Preschool Grants Program) to support mathematics improvements. For example, while local funds pay Consultants' salaries in reading and writing, funds from Titles I and II pay the salary for the Mathematics Consultant.

Title I, the largest federal program, totals about $1.3 million in Norwich. According to the Curriculum Director, approximately 30 percent of Title I funds are used for mathematics at the building level—an estimate that reflects building-level decisions. Norwich schools typically use Title I funds to pay for additional staffing in regular classrooms, salaries of staff in after-school programs, or both. For example, one of the middle schools pays a teacher rather than a paraprofessional to staff its extended-day programs, even though the cost is higher, primarily because the teacher has a proven track record in improving mathematics achievement among targeted students. The district's extended-day programs are broadly focused on improving academic achievement in areas in which students have demonstrated needs. If mathematics is a need, then students receive assistance in this subject.

The bulk of Title II funds (80 percent of the district's $23 000 allotment) are spent on K–8 mathematics. A portion of these funds pays the salary of the Mathematics Consultant, who in turn provides ongoing professional development services to teachers. The remainder of Title II pays for other professional-development opportunities for teachers, such as their participation in state and regional conferences and workshops.

The district also promotes mathematics through other programs:

- Norwich receives a $46 000 Learn and Serve grant, awarded through a competitive state process; three-quarters of these school-based projects have a mathematics component, such as problem solving or statistical analysis. Similarly, Perkins money is used for staff development in computer-assisted design that supports mathematics instruction.
- Goals 2000 money has helped Norwich involve parents in the examination of student work, such as mathematics journals, portfolios, and class projects. The Mathematics Consultant has also helped parents facilitate Family Math nights and workshops to increase awareness of standards-based mathematics instruction.
- Norwich receives about $15 000 through the Middle Grade Schools State Policy Initiative (MGSSPI), a Carnegie Foundation program that funds projects through a competitive state process. MGSPPI supports teacher participation and staff development in a statewide project focusing on performance assessment in mathematics and curriculum integration in the middle grades. The Mathematics Consultant in Norwich chairs the Mathematics Task Force of the MGSSPI.
- State interdistrict cooperative money helps fund Saturday and Vacation Academies, which attract students from Norwich and surrounding communities. As with the extended-day programs supported with Title I funds, these supplemental programs are designed to meet students' demonstrated needs, including their needs in mathematics.

District Leadership

The district's strategic plan includes a matrix of goals, activities, and federal entitlements and provides a clear picture of district uses of Titles I, II, IV, VI, IDEA, and Perkins money. For example, funds from each of these sources (except Title IV) are combined with local funds to purchase appropriate hardware, software, and innovative instructional materials to improve student performance. Similarly, local and federal funds support professional-development activities to enhance teachers' instructional and leadership skills and their capacity to work with diverse populations.

The district's philosophy for using Title I and IDEA funds is inclusionary, based on high expectations for all students. There is neither separate reporting for test scores nor a separate curriculum. Said the Curriculum Director: "That's a significant change from what we had ten years ago.... It says to the student, 'You're [expected to do] regular grade-level work, and I'm here to help you get there.'" Interns, special populations resource teachers, and teacher's assistants work with regular classroom teachers to ensure that all students get the help they need during class, resource periods, and after-school and Saturday sessions. This "differentiated staffing" approach represents a major change for Norwich—a move away from traditional pull-out models of remediation "toward teaching teams where a certified teacher is assisted by an intern in the classroom." The Mathematics Consultant works with the members of these teaching teams to increase their awareness of standards-based instruction and the appropriate CMT mathematics objectives.

Building Instructional Teams

The Building Instructional Team (BIT) at each school serves as the key mechanism for coordinating funds and promoting standards-based instruction at the school level. BITs meet monthly, are chaired by the principal, and typically include teachers of core subjects, special populations teachers, and parents or community members. The team's planning process involves a systematic annual review of CMT data from the previous year; brainstorming sessions on needs, priorities, and strategies; and the design of a comprehensive plan that uses resources from a range of sources to address agreed-on goals and objectives for the coming year.

As part of the decision-making process, schools must complete a matrix that describes needs (designated students, subject areas, evidence to support need, and Building Instructional Team analysis summaries); resources available from Title I and other sources; and a Plan of Action describing specific strategies for directing the resources toward the identified needs. Action plans must focus on improving the achievement of all students.

To customize planning and intervention strategies for students who fall below the proficiency level on the CMT, Norwich schools also have Remedial Action Planning Teams (RAPTs). The RAPT comprises the district's Reading and Mathematics Consultants, the principal, and teachers at each school. Whereas the Building Instructional Team looks at broad achievement trends and school goals for improved performance, the RAPT is "kid focused." Consultants meet individually with each teacher and engage in "good, educational dialogue" about students in need of remediation, the kind of help they need and in what subjects, and ways to best deliver the intervention. "Cross pollination" and coordination of efforts occur through the principal and the Mathematics Consultant, who work with both organizational structures, and through individual teachers, who plan child-specific strategies through the RAPT and who sit on the BIT as well. Communication and dialogue are ongoing.

District Support

Support for standards-based mathematics for all students is high among Norwich district leaders, who advocate for standards-based instruction to the local school board. Once the budget is negotiated and approved by the Norwich City Council, the district allocates local dollars for up-to-date materials and professional development; dedicates Title I and Title II money for the salary of the Mathematics Consultant; and offers teachers opportunities to participate in regional and national conferences, as well as released time to work on statewide projects in mathematics.

Each spring, Building Instructional Teams submit their written action plans to the district's Curriculum Director, who, along with the Superintendent and Director of Pupil Personnel Services, analyzes the plans. Together, these persons provide the "filter" to ensure that schools make the best use of their funds, based on demonstrated student needs. With the district's small central office staff, there are no separate bureaucracies for Title I or IDEA at the district level. Communication is ongoing among district staff, who meet weekly. Likewise, the small number of schools enables district staff to work closely with the BITs, clarifying needs, suggesting ways to use or redirect existing resources, and looking for new resources. Said the Curriculum Director: "It's a tight model saying, 'How are our kids doing? What can we do to improve performance? And what resources can we bring to bear to improve achievement, including best instructional practices and materials?'"

For almost a decade, the Curriculum Director has worked steadily with principals and Building Instructional Teams on the decision-making and budget process, helping them to make informed choices that are based on their needs and priorities. Often, there is negotiation with the schools on their action plans. As the Curriculum Director noted: "The [BIT] is charged with the management of resources to improve student achievement. So, if what they are doing with their Title I money is not improving achievement, they have to answer for why they're doing it or come up with better strategies." In evaluating programs that use Title I funds, district staff look at a variety of factors: Is the program tutorial versus active? How tight is communication between staff who teach after-school programs and regular teachers? Do participating students exhibit improvement in mathematics classes? Do CMT scores improve?

In general, district administrators hold principals and teachers accountable for improved mathematics performance and provide the support that teachers need to improve instructional practices. Said the Superintendent:

> These are the questions I ask the Building Instructional Teams. "From that math score of, say, Johnny Jones, how do you need to change your instruction to meet that need

> and what training do we need to provide for you to do that?" The process is intact to do that. I'm trying to make it into a conversation about kids, where it's okay to say, "I tried this and it didn't work, but here's what I changed because of these data."

Although the district has no written standards for pedagogy, standards-based instructional practices are built into the district's plan for professional development and teacher evaluation. Guided by the NCTM Standards, a central professional-development committee made up of the Curriculum Director, the Mathematics Consultant, and selected principals, identifies areas in need of attention from information gleaned from school plans, teacher-evaluation data, trends on CMT scores, observations, and staff knowledge of best practice. All of this information feeds into the content of districtwide professional-development days. For example, said the Curriculum Director,

> [We offered] math communication because that was something that was important in the NCTM Standards, but we thought it was not really well tested on the Connecticut Mastery Test....We believe it's important for our kids, and we also know that our teachers are not good at facilitating that. So we need to train the teachers. And that's really not grassroots. That's kind of top-down. Now, we try to convince the teachers that they need that training, but they're going to get it anyway!

The district also supports the school-based decision-making process by designating one of the district's five allotted professional-development days for entire school staffs to review test data and discuss strategies for addressing students' needs. Of the remaining four professional-development days, two are districtwide and two are at the discretion of individual schools.

Teachers' Memorial Middle School

Teachers' Memorial Middle School serves about 400 students in grades 7 and 8, including 40 percent minority and 38 percent who receive free or reduced-price lunch. The principal and faculty embrace a middle school philosophy: there are four "houses," two in each grade, and teachers within each house meet daily as a team to discuss students, the curriculum, and other related issues. Says the principal, who has been at Teachers' Memorial for ten years: "Our strength in mathematics is that we do well on the Mastery test. That's a credit to our math teachers. Three years ago we looked at our math scores. They were good, compared with those of other schools, but we thought they could be better."

The Building Instructional Team (BIT) at Teachers' Memorial decides how Title I and other funds will be used. On the basis of student performance on the CMT, the BIT allocates approximately 20 percent of school funds for mathematics instruction. To improve student achievement in mathematics, the BIT then devises a number of strategies. For remedial students who have the furthest to go in meeting CMT goals, the school uses Title I funds for after-school instruction four days a week. The funds pay for a seventh-grade mathematics teacher to work closely with students during this one-hour period. According to the principal: "We can't demand that these students go, but the vast majority attend regularly." As a result, remedial students have shown improvement in test scores.

The principal credits both the teacher responsible for after-school instruction and the members of the Building Instructional Team who "take their job very seriously" and do whatever it takes to ensure that "students have the support they need to achieve in mathematics." The Remedial Action Planning Team (RAPT) also plays a key role. RAPT meetings take place twice a year. In January, the team—individual teachers, the district Reading and Mathematics Consultants, and the principal—meets to discuss each student who has been receiving remediation in writing, reading, or mathematics. The team looks at CMT scores and discusses progress and continuing areas of need for each student. The RAPT also meets in May with sixth-grade teachers from feeder schools to discuss the needs of incoming students.

To further increase instructional time spent on mathematics, Teachers' Memorial built a resource period into the school schedule during eighth period four days a week. During this period, all students report to their home room to make up work, get extra assistance, or start their homework. The resource period also provides time for extra assistance for a targeted group of students. At the beginning of the school year, seventh-grade teachers review the CMT scores of all incoming sixth-grade students. From January until June in seventh grade, and for the first three weeks of eighth grade, teachers work intensively during the resource period with those students who are closest to meeting CMT goals. Said the principal: "The results of that effort were exceptionally good. Thirty-six of the forty students we targeted reached goal. Those two methods of extra math instruction [math problems and targeted group] have really helped. Targeted students get two math classes for half the year, and all kids get extra math."

Wequonnoc Elementary School

Wequonnoc School is a schoolwide Title I school serving 248 students in grades pre-K–6. Two-thirds of the students receive free or reduced-price lunch. The school is an integral part of the community, serving as a resource center for families and a gathering place for school and community activities from 6:30 A.M. to 9:00 P.M. In 1998, Wequonnoc was one of three schools recognized in the state of Connecticut by the Title I Distinguished Schools Recognition Program. To receive this award, schools that operate in high poverty neighborhoods must demonstrate success in ensuring that all students have access to challenging and effective instruction. High standards, coordination with other programs, professional development, school-community partnerships, and demonstrated improvements in achievement data over a three-year period all enter into the equation for recognition.

Along with the Building Instructional Team, the Remedial Action Planning Team (RAPT) at Wequonnoc plays a key role in coordinating strategies for meeting the educational needs of students. The RAPT is made up of the district Reading and Mathematics Consultants, the principal, and teachers. Early in the school year, each teacher meets with the principal and the Consultants to take an in-depth look at those students who have not reached proficiency levels and to develop appropriate intervention strategies. For example, the RAPT might recommend that students attend the Homework Assistance Program or Saturday Academies throughout the year or that they receive extra assistance during the class period from a Title I–funded paraprofessional who works with the regular classroom teacher.

Local, state, and federal funds support an array of activities in which students can receive assistance in mathematics. The After-School Homework Assistance Program, supported with Title I funds, offers grades 3–6 students who are in need of remediation a "quiet, instructionally supportive environment" where they can complete nightly assignments. The program, now in its sixth year, was created from the recognition that many students' homes were ill-equipped for enabling them to do their homework. Classroom teachers recommend students to participate in the Homework Assistance Program. Sessions are staffed by teachers, parents, senior citizens, and high school volunteers. The school has found a direct correlation between time spent in the homework program and the quality of subsequent classroom participation and performance.

Like Teachers' Memorial, Wequonnoc also targets students viewed as "almost there"—those who have fallen below the state goal of excellence on the CMT, but who remain above remedial levels. Teachers consult with grade-level partners, as well as with the students' prior teachers, to pinpoint areas of concern and appropriate strategies. Once identified, "almost there" students are invited to attend Title I–funded, one-hour after-school sessions during the spring of the current year and in the fall of the following year. The program offers both individualized and group instruction by regular classroom teachers three days a week. In addition, students can receive extra assistance during the regular classroom period by paraprofessional staff. According to the principal, "For six weeks, we look at student profiles and decide what kinds of things they need. In most cases, it's paid off. Ninety percent of the kids who were 'almost there' made goal."

San Francisco Unified School District

A clear vision and solid leadership from the Superintendent and other district administrators have helped build a central support structure for K–12 mathematics programs in San Francisco. Extensive districtwide professional development has promoted the district's standards, the use of high quality materials and instructional practices, and leadership development. Site-based interventions have expanded on centrally coordinated efforts. Capacity building of teachers and administrators occurs through the work of mathematics Teachers on Special Assignment and site-based Lead Teachers, who promote standards-based instructional practices, teacher collaboration, and whole-school change.

Decisions about the use and coordination of funds in support of mathematics education are made at the building level by a site-based decision-making team with input from instructional staff, parents, and students. Assessment data and other information support these decisions. Title I funds are typically used in conjunction with other resources to enhance instruction through the use of classroom-based paraprofessionals, supplementary materials, after-school programs, professional development, and parent involvement.

Although schools make these decisions, the district is rigorous in its efforts to see that funds are used appropriately for standards-based, direct educational services. District standards for mathematics have been a driving force for promoting mathematics reform and for coordinating funds to support achievement across student populations. And district-level structures charged with supporting coordinated services help ensure that resources are aligned with the district standards and are used to target schools and students in need of instructional support.

Improvement efforts in San Francisco remain data-informed and inclusive and are based on the strong belief that all children can learn at high levels. The district provides data, creates tools, offers professional development to enable schools "to be wiser in how they spend their resources," and targets schools most in need of assistance. All of these strategies boil down to just two things: holding schools accountable and providing them with the support they need to achieve high standards. In San Francisco, six consecutive years of gains in mathematics achievement have resulted. As the district reaches its goal of all students clearing the 50th percentile, new goals are set, based on even higher expectations.

The case description of San Francisco Unified School District is followed by two examples of how the coordination of resources to support standards-based mathematics education plays out at the school level.

The District

The San Francisco Unified School District (SFUSD) is the fifth largest in the state of California, with nearly 64 000 students. The schools reflect the city itself: they are multicultural and multilingual, with more than sixty nationalities represented in the student population. The school population is 27 percent Chinese, 21 percent Latino, 17 percent African

American, 13 percent Anglo, 7 percent Filipino, and 12 percent other nonwhite. About two-thirds of the district's students are eligible for free or reduced-price lunch. There are seventy-seven elementary schools in the SFUSD (seven of which include students in grades K–8), seventeen middle schools, and nineteen high schools.

Mathematics has been a priority for reform in San Francisco since the 1980s. The district has sought to raise expectations and improve learning opportunities for students who had traditionally done poorly in mathematics. In the lowest performing schools, radical measures were sometimes taken, with entire staffs replaced. At the same time, the district focused on extensive professional development. A Mathematics Collaborative funded by the Ford Foundation helped promote discussions among teachers around curriculum and instruction issues, and partnerships with San Francisco State University and the University of California at Berkeley focused on teacher leadership and curriculum development. In 1992, however, with the hiring of SFUSD Superintendent Dr. Waldemar Rojas, the district began designing a data-informed "systemic and sustainable" plan for mathematics reform.

Rojas promoted mathematics as one of the district's three academic priorities, along with language arts and science. Although his goals for the district have remained constant over the years, they are explicitly reiterated each year to the district, schools, and community. New district requirements for three years of college-preparatory mathematics in high school (covering topics in algebra, geometry, trigonometry, and statistics) have sent a strong message that mathematics is a priority.

District staff who support mathematics improvements are housed in the office of Curriculum Improvement and Professional Development (CIPD). Several CIPD staff members have long been involved in efforts to improve mathematics. For example, Associate Superintendent for CIPD Maria Santos began her work in the district in the 1980s as the only K–8 and then K–12 Mathematics Teacher on Special Assignment, charged with initiating and supporting improvement efforts. Since then, the CIPD mathematics staff has expanded to include the Program Director for K–12 Mathematics and Science and ten mathematics Teachers on Special Assignment (TSAs), who facilitate change in elementary, middle, and high school mathematics programs. The CIPD building hums with mathematics-related activities: planning meetings with district and school staff; professional-development sessions; and curriculum-, assessment-, and standards-development activities.

Although the Superintendent and CIPD provide a clear vision for mathematics improvements, time spent on "collective conversation" to gain widespread support for academic goals has been a major part of the reform plan. After Rojas entered office, the next two years were "spent just on conversation" to increase awareness about standards, targeted goals, professional-development needs, accountability, and site-based strategies for change. Participants in discussions included school and district staff, university partners, and representatives of the community at large. School-based meetings, focus groups with parents, and an informational brochure on the district's Content and Performance Standards have helped broaden awareness and support. According to Associate Superintendent Santos:

> One of the things we do is put out a five-year plan and let the community know where we are and what we plan to chip away at that year. Right now, we're in the middle of the five years, so we can say, "Look at what we've accomplished and this is the next layer of work." We can point to where the changes are and see the possibilities, because in this community, we believe that all kids can learn.

The need for local community support is particularly strong in California, where Proposition 13 and other policies have curtailed funds for education. The city of San Francisco responded by passing two bonds for a total of $90 million for school facilities and technology. Laying the groundwork, and keeping essential players both informed and involved, has been crucial for enabling the district to gain support and proceed with "real shifts."

Reform efforts are paying off. Since 1992, mathematics test scores have improved each year across grade levels, and the percentage of students in the bottom quartile on nationally

normed tests has decreased significantly. Although these improvements show progress, continued performance gaps among various student groups have prompted the Superintendent to push for equity and accountability, with heightened efforts to raise achievement levels to the 50th percentile among African American, Latino, and English Language Learners (ELL) by spring 1999 and for special education students (who are not exempted for testing) and "youngsters of poverty" by spring 2000.

The Mathematics Program

In San Francisco, the district's recently adopted Mathematics Content and Performance Standards are the "focal point for everything." Initiated in 1995 parallel to the development of the Challenge Standards in mathematics by the state Department of Education, the district mathematics standards reflect national guidelines and emphasize communication in addition to a balanced program of developing concepts, skills, and problem solving.

The implementation of district standards has required teachers and administrators to shift from "compliance-driven to performance-based instruction." Said Santos: "We've been working on making people aware of the standards and getting them to understand them as a tool to move the whole system. That takes a lot of coaching. You've got to get people to change their mindset from 'What do I think the student can do?' to 'Here's a standard. How am I going to get the student to that standard?' And that's a big shift in thinking." To add to this challenge, the shortage of qualified mathematics teachers is a persistent problem in San Francisco. Many in the classroom remain underprepared, particularly at the middle school level, where 70 percent of the teachers lack a college-level mathematics background.

With high numbers of beginning and underprepared teachers, the district focused on professional development as a central strategy for change. At the same time, the SFUSD looked toward identifying materials that were aligned with state and national standards. In 1994, the district adopted *MathLand* for the elementary grades and *Glencoe: Interactive Mathematics* for the middle grades. Both programs were selected from a list of options sanctioned by the state, and their selection was based on a set of criteria developed by a district review committee.

The SFUSD then supported widespread implementation of the materials over the next two years by dedicating three of eight annual districtwide professional-development days each year to mathematics to help teachers become familiar with new units. In addition to centralized efforts to support mathematics reform, the district took early steps toward building a school-based infrastructure to support improvements. Summer institutes in 1995 on mathematics content, pedagogy, and newly adopted materials prepared 150 Lead Teachers (approximately two teachers from every elementary and middle school) for leadership roles in their schools.

Since that time, the district has continued to refine professional-development opportunities to reflect district needs with an emphasis on professional development for teachers new to the district. "Algebraic thinking" has become a unifying theme in professional development for all teachers, both to lay the foundation for algebra classes offered in middle and high school and to support articulation across grade levels. The district has been proactive in ensuring that teachers from bilingual and special education, as well as paraprofessionals who assist regular classroom teachers, attend staff-development sessions on mathematics, holding principals and school-based Lead Teachers accountable for the attendance of all teaching staff.

Although San Francisco initially focused on grades K–8 mathematics because of the instructional materials adoption process, the five-year plan for improvement spans all grade levels. Efforts at the high school level to date have focused on reviewing and piloting high-quality materials for grades 9–12 and on integrating mathematics with science and technology. A grant from NSF enabled the district to pilot the *Interactive Mathematics Program* in five high schools. Other high schools piloted a college-preparatory course developed through the

California Mathematics Project. An extensive review of these and other materials by the high school adoption committee resulted in the districtwide recommendation of three programs, one of which is *Interactive Mathematics*.

At the high school level, CIPD has also looked toward supporting students now required to take more rigorous mathematics courses. For example, the district has allotted funds that enable all middle and high schools to extend the school day with an additional class period to give students more preparation for college-preparatory mathematics classes. The class "provides the scaffolding" that students need to succeed, focusing on areas of demonstrated student need. The district has also budgeted additional funds to secondary schools for student support services such as before- and after-school tutoring and Saturday programs.

From 1994 to 1997, California had no state-mandated test. Nevertheless, because of SFUSD's emphasis on accountability, the district continued to test student achievement during this period using the California Test of Basic Skills (CTBS) in grades 1–11. Recently, the state enacted the State Testing and Accountability in Reporting (STAR) program, which requires all districts to administer the Stanford Achievement Test 9th Edition (SAT9) in grades 2–11. Like the CTBS, the SAT9 is standardized and norm-referenced. However, the new test has provoked controversy in San Francisco because it is not aligned with district standards and the state mandates that the English-only version be used.

In the meantime, the district staff and Lead Teachers have developed middle grades mathematics assessment tasks that are closely aligned with the Glencoe curriculum and the district's Content and Performance Standards. The assessments were developed to improve classroom instruction and to afford school staff an opportunity to look at student work across grades. Currently, the effort is being expanded to create assessment task items for grades 3, 6, and 10. Said one CIPD administrator: "What we're trying to do is not let the changing winds of the state affect what we've been moving toward, which is implementing standards, building a comprehensive assessment system, and supporting our low-performing students."

Teachers on Special Assignment and Lead Teachers

CIPD Mathematics Teachers on Special Assignment and school-based Lead Teachers are crucial players in the district's reform efforts. TSAs help design and conduct districtwide professional development activities; create tools to assist teachers with implementing materials; help review mathematics materials during the adoption process; and suggest supplementary materials for classroom use. In addition to this centralized role, Teachers on Special Assignment serve as a key communication link between CIPD and the schools. In addition, each TSA works intensively with two to three Targeted Schools—schools most in need of improving achievement among African Americans, Latinos, and English Language Learners. TSAs spend several days a week in these schools, working with teachers, bilingual and special education staff, paraprofessionals, and volunteers to improve instruction.

School-based mathematics Lead Teachers teach full-time while also coaching their colleagues. Lead Teachers have proven essential for keeping administrators informed about mathematics instruction, and the district has tried to identify a Lead Teacher in each school. Currently, more than half of the elementary and middle schools have identified mathematics Lead Teachers, many of whom were involved in the district's mathematics curriculum adoption process. Lead Teachers have received extensive professional development and continue to gain leadership skills through their work with TSAs. Joint efforts include planning and implementing in-service education activities, developing curriculum guides to assist teachers in implementing the standards, reviewing mathematics materials, and developing mathematics assessment tasks aligned with the Glencoe curriculum and district mathematics standards.

Coordination of Resources

Efforts to align standards, curriculum, and professional development, as well as a strong emphasis on accountability, provide the push for resource coordination in San Francisco. According to the Associate Superintendent of CIPD:

> Centrally, we're building a tighter and tighter mechanism. The accountability plan and professional development—those are the big drivers. The district's goals and objectives, the Superintendent's priorities and vision, the standards—all of that is really focused....The sites then look at their data [relating] to math, science and reading, and write their plan from their perspective, asking "What do we need to do to get there?"

The district has invested significant local resources for mathematics improvement. In 1997–98, about 4 percent of the district budget was dedicated to professional development in mathematics—roughly $1.5 million. San Francisco uses federal programs such as Titles I, II, VI, IDEA, and Goals 2000 to "look strategically beyond what local and state funds are doing." About 85 percent of the district's Title II funds support mathematics, providing additional resources for professional development, teacher stipends, substitutes, and release days. The district has also used a state Eisenhower grant to support the implementation of *MathLand* and to help purchase supplementary materials and provide professional development for Lead Teachers in the use of these materials.

San Francisco receives about $11 million in Title I funds each year. The majority of these funds (about 88 percent) are distributed directly to the schools. CIPD estimates that approximately 30 to 40 percent of Title I funds support mathematics at the school level. Schools use these funds to pay paraprofessionals who work in mathematics classes with targeted students; to buy software, manipulatives, and high-quality supplementary materials, such as *Investigations in Numbers, Data, and Space* and *Connected Mathematics*; and to support staff development, Family Math or other parent involvement activities, and mathematics-related field trips.

State and federal programs, including Title I, "work right with the district's targeted goals" as part of CIPD. To promote district-level coordination, the administration of these programs was moved into the CIPD in the fall of 1997. The change reflected heightened efforts on the part of the district to ensure that all programs target district goals, are consistent with the district's Content and Performance Standards, and promote quality learning opportunities for all students.

According to one CIPD administrator, it was difficult to get school staff to view Title I as "educational programs, instead of just additional resources." Before 1994, Title I funds were used more extensively to support clerical or administrative staff. CIPD now monitors the use of Title I funds to make sure that they supplement the core curriculum. The process has required some difficult decisions. For example, several years ago, when schools had shown no improvement in test scores, the district eliminated positions for 300 resource teachers with "quasi-administrative" roles and replaced them with reading specialists who have extensive preparation in working with students and parents.

Thirty-nine of the fifty-four elementary schools and six of the eight middle schools that qualify for Title I funds operate as schoolwide programs. There is also a schoolwide Title I program in one of the high schools. San Francisco also receives $11 million in State Compensatory Education (SCE) funds. SCE money and a number of other state resources are used in conjunction with Title I to support low-achieving students, including School Improvement Program funds, which support whole-school reform; Consent Decree funds for schools with high numbers of African American and Latino students; and LEP funds for Limited English Proficient students. The SFUSD works hard to ensure that funding decisions are standards-based, data-informed, and aligned with district priorities. The district uses a variety of district- and school-based strategies for promoting the coordination of these resources for mathematics improvement.

District-Level Structures

SFUSD has several mechanisms that facilitate a coordinated approach to the improvement of mathematics learning in the district. For example, the Interdepartmental Team meets monthly and focuses on Targeted Schools—those with the lowest achievement scores in mathematics and reading. The Team also prepares an Interdepartmental Services Action Plan to address the needs of these schools. The plan details how members of the team will work with schools to coordinate school, family, and community services in support of low-performing students. A second group, the Articulation Council, meets monthly to share information, coordinate both district- and school-based strategies, and keep the focus on standards-based instruction for diverse student populations. Discussions often revolve around low-performing schools and how resources from various departments can best support students in mathematics.

The district's Extended Cabinet provides still another vehicle for coordinated planning and policy-making. The Cabinet includes district-level instructional personnel as well as staff from business operations, finance, and facilities. This group looks at broader strategies, such as understanding professional-development needs and resources, creating incentives for teachers to use research-based materials, developing strategies for strengthening the roles of Lead Teachers, staffing schools with well-qualified personnel, and exploring needs for translating curriculum materials into other languages.

School-Level Structures

In San Francisco, schools are the locus of decision making on how to use Title I funds to support mathematics. Each school has a School Site Council, sometimes chaired by principals but usually by parent and teacher co-chairs. At the elementary and middle schools, School Site Councils comprise parents and school staff; students are also included in the mix in middle and high schools. School Site Councils meet at least monthly, engaging in an ongoing cycle of planning, implementing, monitoring, and assessing site-based activities aimed at meeting district and school priorities. To develop School Site Plans, the Council uses both quantitative and qualitative data (e.g., achievement scores and documentation of site-based professional development). In making policy and budget decisions, the School Site Council receives input and suggestions from instructional staff; a Bilingual Advisory Committee made up of parents of English Language Learners; and a School Advisory Committee made up of other parents or community members.

School Site Councils also make important decisions about resource coordination. For example, California promotes a comprehensive and coordinated approach to school improvement through its School-Based Coordinated Program, and School Site Councils vote on how coordination will occur. Schools can consolidate separate state funds (e.g., State Compensatory Education, School Improvement Program, Consent Decree, Limited English Proficient) under a single appropriation as a way of coordinating different resources, or they can simply coordinate services without combining resources on paper. In short, the School-Based Coordinated Program is both a "method of thinking" and a way of budgeting that promotes integrated services for low-achieving students, and CIPD works with schools to fully embrace the rationale behind the program.

Resources and strategies are further coordinated through the Student Study Team (SST), which helps address the needs of students in the lowest quartile. Comprising a teacher, a counselor, a Healthy Start coordinator, or other appropriate staff, the SST meets with parents or guardians to design a plan that ensures resource coordination in service of low-achieving children. Said one principal: "Out of the SST process, a student may be referred to the After-School Learning Club or a primary intervention program....It's the funnel through which students and families receive services. We find all the resources, and everybody sits down together and comes up with a plan to support the child."

School Accountability

Improved mathematics performance, particularly for African Americans, Latinos, English Language Learners, and learning disabled students, is one of the district's top priorities, and schools are held accountable in their School Site Plans for meeting these priorities. To ensure that School Site Plans make the best use of funds to support district priorities, staff from CIPD, Special Education, and other departments review them and provide suggestions in writing for how the Plan might be improved. The district also prepares a variety of "tools" to help schools with planning, including documents that elaborate on the process and examples of well-written school plans and activities tied to specific goals and objectives. Said Associate Superintendent Santos:

> We try to get schools to see that the school plan is their planning tool, saying to them, "We're not doing this just for compliance or to get your categorical money. This is for you to use to improve your school." We've been working for years to try to make it a more effective tool for the schools to use to really get their community behind improvement efforts.

The district also reviews data collected by the schools and compiled throughout the year in their School Portfolios. The Portfolios are scored on both quantitative and qualitative criteria with a point system matched to district goals and objectives. Improved student achievement is undeniably a central area of focus, with the largest number of points awarded for increased numbers of students who reach the 50th percentile in mathematics, science, and language arts. The district also examines the extent to which schools are using data appropriately for planning, implementing, and assessing instructional programs and how professional-development activities improve teaching and learning for all students.

Every third year, each school undergoes an intensive Program Quality Review to examine evidence of progress in meeting school and district instructional priorities. As part of the Program Quality Review, schools choose a particular subject (within the district priorities of mathematics, language arts, or science) and focus improvement efforts on this subject. External consultants facilitate the school's development of a comprehensive plan for improvement in the chosen subject, which describes how the plan will be implemented over the next two years. At the end of the cycle, teams of consultants, typically teachers or retired administrators from outside the district, visit the schools to judge how well they have met their objectives. As one CIPD administrator described the Program Quality Review: "It's a feedback mechanism for the schools, and they take it seriously and use the information to improve their School Site Plans."

Professional Development

The SFUSD focuses substantial efforts on building the capacity of administrators to lead change at the building level. A three-day institute at the beginning of the school year includes a briefing by the Superintendent on district priorities, as well as sessions on Content and Performance Standards, School Site Plans, and the coordination of resources.

Throughout the year, principals meet twice a month. One meeting focuses on business issues; the other meeting is with CIPD staff and centers on professional development on content and curriculum, standards-based instruction, teacher evaluation, coordination of funds, team-building and facilitation, and portfolios and assessment. Similar sessions are held for new, veteran, and aspiring school administrators to help them become more aware of best practices, both in mathematics and in the coordination of funds. Mathematics Teachers on Special Assignment work with administrators in Targeted Schools to help them facilitate change.

Several Principals on Special Assignment also work with schools and other administrators to increase their capacity for supporting school improvement. Although not specifically mathematics-related, their responsibilities can contribute to strategies that support mathematics improvement.

CIPD staff have worked increasingly toward coordinating professional-development, leadership, and networking opportunities to strengthen school-based learning communities. For example, the district has linked clusters of schools on the basis of geographic proximity. This strategy capitalizes on existing connections across schools and makes it more convenient for groups to convene. Teachers on Special Assignment work with clusters of four or five schools, meeting as a group with representative Lead Teachers. These meetings alternate locations among the clustered schools and address topics that help Lead Teachers work with their colleagues.

Edward R. Taylor Elementary School

E. R. Taylor Elementary School is one of the largest elementary schools in San Francisco, with more than 700 students in grades pre-K–5. The multiethnic population includes about 28 percent Latino, 24 percent Chinese, 13 percent African American, and 13 percent Filipino, with the remainder a mix of other nonwhite students. Almost three-quarters of the students qualify for free or reduced-price lunch. There are English Language Development classes for Chinese and Spanish students, as well as other English Language Learners, to supplement regular classroom instruction. The school was one of the first Healthy Start sites in the state, and it is currently a Leadership School in the Annenberg-funded Bay Area School Reform Collaborative to promote higher student achievement through school-based reform that is based on district standards.

E. R. Taylor has a schoolwide Title I program and spends about 25 percent of its Title I funds on mathematics. The bulk of these funds are used for paraprofessional salaries to reduce the adult-to-student ratio during mathematics instruction. Title I funds also help purchase supplementary materials and mathematics manipulatives. Decisions about how to use funds to support mathematics are made by the School Site Council, composed of the principal, teachers, other staff, and parents. The Council meets monthly throughout the year to review data and monitor progress. Annual parent surveys, student performance on the CTBS, and input from the entire school community help determine instructional gaps. Said the principal, "The [School Site Council] shapes the focus of what we do. They're very good at questioning what we do, and that's really important because it makes the teachers think about the purpose behind the activities." A Bilingual Advisory Committee, which meets monthly, and a more informal group of bilingual parents who meet outside that committee also take their concerns and suggestions to the School Site Council.

Title I enters this discussion as just "another way to support learning for all the students." The School Site Council sets its own priorities, looks at priorities set by teachers and parents, considers the various pockets of money, and "juggles all of the factors until we get a decision." For example, Title I funds support paraprofessionals who work with students below the 40th percentile in mathematics, and state Consent Decree and other funds augment services for targeted students through support services and materials. Similarly, the After-School Learning Club, initiated through Healthy Start and now supported with private sector funds, enables regular classroom teachers to work with targeted students twice a week after school. Title I, Consent Decree, and Annenberg funds are all used to support professional development for teachers. As the principal noted, the standards are essential for coordinating resources: "Everything we're doing is leading in the same direction, and that's leading to student achievement, and that changes the way we use funding."

The Student Study Team is another mechanism for ensuring that students get the support they need. A teacher or parent/guardian can request that a Student Study Team convene to determine interventions for a student who is experiencing academic or other difficulties. The team can consist of the teacher, the Healthy Start coordinator, a counselor, the principal, or other appropriate staff, who then meet with the parent (and sometimes the student) to determine appropriate intervention strategies.

Visitacion Valley Middle School

Visitacion Valley serves more than 500 students in grades 6–8, including about 28 percent African American, 24 percent Chinese, 16 percent Filipino, 16 percent Latino, and about 16 percent other nonwhite students. About two-thirds of the students qualify for free or reduced-price lunch. Although mathematics test scores at Visitacion Valley have steadily improved over the last four years, the school was one of eight middle schools targeted by CIPD during 1997–98 to receive weekly support from a mathematics Teacher on Special Assignment (TSA). During the year, the school took a hard look at how they provided services and saw a greater need to focus on students in need of instructional support in mathematics. They monitored sixth graders, identified students having difficulty, wrote an enrichment curriculum with the assistance of the TSA, and targeted students for an after-school program. As seventh graders, these students participate in regular mathematics classes and receive after-school instruction that uses the enrichment curriculum.

Title I funds, in conjunction with resources from Consent Decree, Healthy Start and a 21st Century grant, help pay for materials and staffing for after-school tutoring programs at all grade levels. The school uses a combination of regular classroom teachers, paraprofessionals, and university students to staff the after-school program. Visitacion Valley has also used its Title I funds in more innovative ways. For example, the school is currently setting up an "Incentive Store" to encourage targeted students to attend the after-school program. Students who participate in after-school sessions receive a coupon redeemable at the store to "purchase" a calculator, computer disks, and other mathematics-related items. Both Title I and 21st Century funds support the store. Visitacion Valley also uses Title I funds to pay four parents who work as school-community liaisons. Known as the Parent Action Team, they help coordinate meetings with central stakeholders, work with the after-school program, meet with the principal every other week, and call parents to engage them in the educational process.

Decisions about the use of Title I funds are channeled through a process that involves the entire school community, including instructional staff, families, and students. At the building level, a Leadership Team consists of teachers from academic subjects; bilingual, special education, electives, and enrichment programs; and pupil services. The Team meets regularly during the year to review programs and in the spring, on the basis of test scores and a review of "what worked and what didn't," creates a preliminary Site Plan for the next year. Student Study Teams help identify strategies for individual students who need extra assistance in mathematics. At Visitacion Valley, the Student Study Teams (including the principal, teachers of targeted students, and other noninstructional staff) meets weekly. In addition, groups of teachers at each grade level meet with the school's social workers each week to make joint decisions about student needs and interventions.

Finally, the site plan and budget are "funneled" through the School Site Council, which includes school staff, parents, and students and helps the school "decide if what we're doing is worthwhile." Members of the Parent Action Team, Bilingual Advisory Committee, and School Advisory Committee are represented on the School Site Council, and they provide input in the decision-making process.

Traverse City Area Public Schools

Since the early 1990s, mathematics improvement has been at the forefront of education reform in the Traverse City Area Public Schools. What began as a curriculum improvement project has led to a well-integrated, highly supported strategic-planning process that is needs-based and results-driven. The district's Curriculum Alignment and Assessment Process (CAAP) represents an approach that has led to an increasingly more elaborate system of structures, procedures, and products designed to enhance the education of all students.

Key leadership for the mathematics education program in the district is provided by the Mathematics Steering Committee, the members of which represent diverse stakeholder groups (e.g. teachers, principals, parents). Under the guidance of this committee, standards-based curricula have been adopted districtwide at all grade levels, and two district-level mathematics coordinators provide extensive professional development to help teachers and teacher aides implement these materials effectively. The Michigan Educational Assessment Program (MEAP) assesses student performance in mathematics in grades 4, 7, and 10. As part of its curriculum reform efforts, the district is developing an expanded assessment program that matches the adopted curriculum in every grade (K–10) and gives teachers and administrators more frequent evaluations of student progress.

A number of elements are now in place to drive the strategic-planning process that characterizes operations and decision making both at the central office and at individual school sites:

- A district-level plan developed collaboratively by a diverse group of stakeholders
- Building-level school improvement plans that reflect both the district-identified goals and the unique context and needs of each school
- A process in place to review, implement, and revise district and school improvement plans
- A network of district staff and committees that encourages coordinated planning and the sharing of strategies and results

A "needs-based and results-driven" planning and decision-making process underlies the district's strategic approach to reform, including the district's use of funds to support the work of the schools. Consistent with the district's approach to planning and implementation, individual schools are able to assess their needs and coordinate the use of funds from multiple sources to support all students' learning in an integrated and inclusive manner. At both the school and the district levels, there is a concerted effort to collaboratively assess needs, plan and implement strategies to address identified needs, and pay close attention to evaluation data on the effectiveness of those strategies.

The District

The Traverse City Area Public Schools serve 11 000 students in grades K–12. Unlike other Michigan districts of comparable size, Traverse City is in a rural area of the state. The population is primarily white; only 2 percent of the students are racial or ethnic minorities. Twenty-three percent of the students receive free and reduced-price lunches. The Traverse City district has eighteen elementary schools, two junior high schools, and two high schools.

Reform of the curriculum program began in Traverse City eight years ago, when the central-office administration initiated changes designed to enhance the curriculum-selection process for the core content areas of mathematics, language arts, science, and social studies. Positions were created for content coordinators in all the core subjects, which provided district-level staff who would not be "tied down to the day-to-day activities of classroom instruction" but could devote full-time attention to staying current in the field and facilitating the coordinated selection and implementation of curricula across grade levels.

In recent years, the work of curriculum alignment and assessment of student learning has become formalized through the Curriculum Alignment and Assessment Process (CAAP). Phase I of CAAP focuses on the alignment of core curriculum with the state content standards and district school-improvement objectives. Phase II involves the development of "multiple common assessments" for grades K–10 in the core content areas.

The Traverse City reform effort coincided with state reform efforts to develop new frameworks in core content areas that would reflect national standards and to revise the statewide assessment, the Michigan Educational Assessment Program (MEAP).

The Mathematics Program

In Traverse City, mathematics has been on the leading edge of the reform effort. Changes in MEAP and the subsequent mathematics scores of Traverse City students on the revised assessment supplied some leverage for district staff to encourage teachers to explore and buy into reform-based curricula. According to Mathematics Coordinator Dan Fouch, "The MEAP test...was really the impetus that [we] needed to move ahead in this district....With our [low mathematics] scores at that point in time, we realized, as a district, that we had to change."

Over the course of six years, standards-based curriculum materials were selected, piloted, and eventually adopted for all schools at each grade level. The district adopted TERC's *Investigations in Numbers, Data, and Space* for the elementary level, the *Connected Mathematics Program* for the junior high schools, and *Contemporary Mathematics in Context* from the Core-Plus Mathematics Project at the high school. Currently, mathematics is entering Phase II of the CAAP process, developing assessments for each grade level that is not tested through MEAP. (MEAP is administered each year, with mathematics tested in grades 4, 7, and 10.) The district assessment instruments are expected to be tightly linked with specific curriculum units and administered frequently throughout the year. To supplement district efforts, Traverse City is working with Michigan State University in an NSF-funded project to develop grade-by-grade assessments for mathematics.

Mathematics Steering Committee

In Traverse City, the work of curriculum alignment and assessment is largely the responsibility of the Mathematics Steering Committee. This K–12 committee initially brought together teachers, principals, school counselors, and parents to examine the NCTM standards and plan what they would like to see in Traverse City classrooms at each grade level. After establishing what mathematics instruction should look like, the committee sought curriculum materials that matched this vision.

Today the Mathematics Steering Committee remains an integral part of the district's infrastructure. The work of the committee is documented in a three-year plan that is integrated into the district's school improvement plan and updated annually. This plan identifies districtwide goals for mathematics and provides guidance for district-level activities and decisions. The plan also encompasses curriculum changes (as needed), staff-development needs, and materials and resource needs and defines criteria by which the mathematics education program will be evaluated.

Mathematics Coordinators

Traverse City employs two mathematics coordinators, who, in addition to serving as co-chairs of the Mathematics Steering Committee, are responsible for providing districtwide professional development. The mathematics coordinators also serve as a resource for teachers and schools as specific needs are identified for students in individual classes or schools. The mathematics coordinators assist with the analysis of assessment data; they help identify areas of need in the implementation of the standards-based curricula; they recommend strategies and resources available to meet goals for student learning; and they assist in monitoring the effectiveness of strategies that have been implemented to address student-learning goals in mathematics.

Professional Development in Mathematics

The main focus of districtwide professional development is to help classroom teachers implement the newly adopted standards-based curricula. One strategy has been to help teachers understand where their grade-specific units fit within the overall mathematics curriculum. This approach helps teachers be aware of how particular concepts or skills will be revisited in other grades. The approach also enhances teachers' own understandings of mathematics by clarifying how a particular unit ties into broader mathematics concepts.

Teachers' aides participate in the same professional development offered to regular classroom teachers. Because the aides, too, are familiar with the standards-based curricula and have experienced professional development in the classroom implementation of the materials, their value and versatility as classroom instructors has been enhanced. Typically, teacher aides play an integral role in classroom instruction, which allows greater flexibility in how lessons are organized and implemented. For example, by sharing instructional responsibilities, teachers and their aides are able to offer more opportunities for targeted instruction for any student who needs additional attention.

Traverse City teachers have access to other professional-development opportunities through the district's participation in several NSF-funded, university-based projects. For example, high school teachers are participants in Western Michigan University's Local Systemic Change (LSC) project, Renewing Mathematics Teaching through Curriculum (RMTC). Through this project, Traverse City teachers are receiving professional development to become teacher leaders and are conducting workshops within the district for their peers in the implementation of the *Contemporary Mathematics in Context* curriculum. Another project at Michigan State University has given the district a full-time coach for the past two years to work with teachers who are implementing the *Connected Mathematics Program* in the middle grades. The addition of this coach makes it possible for the two district mathematics coordinators to focus on supporting the implementation of elementary and high school curricula.

Student Achievement in Mathematics

Efforts toward improved mathematics curriculum and instruction have produced tangible results for Traverse City students. Schools have had great success in improving their students' performance on the statewide assessment. Individual schools and the district as a whole have seen MEAP scores improve. For example, summaries of districtwide results show that the percentage of seventh-grade students in the district who scored "satisfactory" on the mathematics examination rose from 65 percent in 1994 to 78 percent in 1998. Similarly, recent summaries of data that compared the results for grade 4 and grade 7 MEAP assessments showed that Traverse City students scored above comparable state averages and that the rate of growth between grades 4 and 7 was greater than that in the state as a whole.

District staff members are particularly pleased that marked improvement has occurred not only among the general student population, but also among special education and at-risk students as well. The district's Executive Director for Effective Schools, Dave Dean, commented:

> We know the curriculum we've adopted has larger numbers of youngsters succeeding, and a larger group in the middle who are competitive in terms of being competent math students....Math used to sort and select—only certain youngsters got access to the upper levels. The new curriculum gives a much broader range of youngsters access to the higher levels of math, which is all very positive.

Coordination of Resources

Important sources of federal funding for mathematics instruction in Traverse City are Title I, Title II/Eisenhower, and Goals 2000. Particularly important to the schools' implementation of programs are state "at-risk funds" and the support from the local general fund. The district has also invested a considerable amount of its own resources to fund the change process by providing the people, materials, and supplies required to implement districtwide curriculum reform.

To support the Curriculum Alignment and Assessment Process (CAAP) and related mathematics improvement efforts, the district blends a variety of local, state, and federal funds. About $100 000 is invested in CAAP through a combination of Goals 2000, state at-risk, and general funds from the district. The funds are split four ways to support work in the four core content areas; the mathematics program receives $21 000 through this project, which funds the work of the Mathematics Steering Committee—including development, implementation, and update of the district's three-year plan for mathematics.

Federal funds also have helped support extensive professional development for teachers and teacher aides as they implement standards-based curricula in their classrooms. All Eisenhower funds are directed toward professional development around implementing the mathematics curricula, including *Investigations*, *Connected Mathematics*, and *Contemporary Mathematics*. Eisenhower funds provide stipends to participating teachers and also pay for substitutes. The district also takes advantage of other opportunities for professional development and support by participating in NSF-funded mathematics education programs at Michigan State University and Western Michigan University.

A significant use of Title I funds in Traverse City has been to hire staff persons who play crucial roles in accomplishing the goals identified at both district and building levels. At the district level, Title I money (combined with district funds) pays the salary of a second mathematics coordinator. At the building level, Title I pays for teacher aides who work in classrooms with regular classroom teachers—working with anyone who needs help. As noted earlier, these teacher aides participate in the same professional development as regular classroom teachers, which enhances their capacity for classroom instruction.

In Traverse City, 80 percent of Title I funds are allocated to eleven of the district's eighteen elementary schools, those with the highest proportion of students eligible for free or reduced-price lunches. Depending on the particular needs that are identified, Title I might be used to support students in reading, mathematics, or science (each of which is tested under the Michigan Education Assessment Program). In addition to paying teacher aides, funds are often used to provide additional support materials that will address identified needs of students. In describing the importance of federal funds for his school, one principal commented,

> The greatest impact of these funds on learning is the adult bodies in the classroom to support student learning. That is where we put most of our money. At the beginning of the year we spend a lot of time looking at the personnel we have—all of them: Title I, the resource teacher, consultants, and [teacher aides]—and how best to use their services to meet the needs of the largest possible number of students. We've always tried to do that, but now it's a very structured and deliberate process.

District-level and site-based planning and decision making are well-integrated processes in the Traverse City school system. The district has procedures to collaboratively develop then clearly communicate expectations regarding student achievement and quality of pro-

grams. The adoption of common curriculum has served as an important mechanism for defining common parameters for individual school sites. Each school site has autonomy in developing plans for school improvement and making decisions about how best to use available funds; yet schools are clearly accountable for meeting district and school goals. Just as important as the district and school improvement plans themselves are the processes and people that encourage collaboration and provide extensive support.

Integrated Planning and Communication

Planning at the district and school levels is a collaborative process that is accomplished through the work of a network of committees. Overlap in membership among these committees helps to ensure continuity and the sharing of information and strategies. At the district level, three committees focus on school improvement and operational planning:

- The *Superintendent's Cabinet* is made up of senior and mid-level central office administrators and school principals. The Cabinet is a decision-making body for the district, advising and making recommendations to the superintendent and the school board on all aspects of school policy and operations (including curriculum and student performance).
- Members of the *District Quality Council* (DQC) represent diverse affiliations: central office administrators and staff, building-level administrators and staff, parents, business leaders, and school board members. The DQC serves as an advisory board to the Superintendent's Cabinet and is also responsible for approving and overseeing the District School Improvement Plan. In this capacity, the Council is charged with ensuring that "the direction of the district is consistent with the mission, beliefs, and objectives of the District School Improvement Plan."
- The *District School Improvement Annual Update Team* includes a subset of members from the Cabinet and the District Quality Council. A central function of the Update Team is to review and revise the District School Improvement Plan each year on the basis of input from various district committees. The District School Improvement Plan (DSIP) is the overarching guide for decisions and activities of personnel at all levels within the district. This district-level action plan targets mathematics and three other core instructional areas, and it includes plans for curriculum alignment and assessment, professional development, and instructional leadership. The mathematics component of the DSIP is developed by the K–12 Mathematics Steering Committee, and the Update Team assimilates the plans for mathematics and other core content areas into the final DSIP.

Every school in the district has a School Improvement Team whose members include school administrators, teachers, and parents. The team is responsible for developing a building-level School Improvement Plan that reflects the broad goals set by the district (i.e., in the District School Improvement Plan) as well as the school's assessment of its own needs. The School Improvement Team is also responsible for allocating funds to maximize progress toward district and school goals. Included within each building's School Improvement Plan is the MEAP Plan, which lays out the school's strategies for improving performance on the state test. This plan is developed by all teachers in the school on the basis of a detailed analysis of their students' scores on the statewide assessment. Currently, the district is looking more closely at how to further enhance the evaluation component of School Improvement Plans by encouraging schools to become more sophisticated in the questions they pose and the strategies they use to evaluate progress toward identified goals.

Just as there is duplication of membership across the three district-level committees, there is also some overlapping membership between district- and school-level committees. For example, the K–12 Mathematics Steering Committee includes two teachers from each grade

level. As members of the Mathematics Steering Committee, these teachers are involved heavily in district-level planning; they are also responsible for developing MEAP plans in their individual schools. Rotating memberships on committees (e.g., every two years on the Mathematics Steering Committee) further facilitates awareness, involvement, and buy-in among a greater proportion of school and community representatives.

In addition to orchestrating collaborative decision making, the district encourages everyone involved in educating students in the Traverse City system to share strategies and results. The physical proximity of central office staff involved in coordinating, monitoring, and administering curriculum and instruction programs is a deliberate arrangement designed to enhance ongoing dialogue and consultation. In addition, formal meetings occur routinely among central office staff; between central administrators and all school principals; and among clusters of school staff. One strategy for communication is the formation of "pie groups" consisting of elementary schools that share common characteristics and goals. Administrators and teachers from these clusters meet in grade-level groups to share strategies and results from their schools as they work to implement the core curriculum materials.

Accountability Procedures

Underlying the accountability procedures in Traverse City is the belief that "the focus for accountability should be where delivery occurs." Principals are accountable for the progress of their own buildings in a variety of ways. Strategies for school improvement are described in School Improvement Plans, which contain school improvement objectives that can be measured through data collection. These plans are reviewed both by central office staff and by the District Quality Council for compliance in using funds and soundness in addressing school and district goals.

All players at the district and building levels pay close attention to assessment results to assess progress and determine continued needs; advancement toward identified goals is the basis of determining how effectively the school is using federal, state, and district funds. In the core content areas, students' performance on the MEAP (the results of which are publicly reported for each school and the district as a whole) are a major source of data and a focal point for the assessment of progress. All principals meet with central office staff to review and discuss MEAP results for the district. Also, principals are directly accountable to senior administrators in the central office, who conduct annual evaluations of principals' work that are based heavily on students' performance on the MEAP and other assessments of progress toward school improvement objectives.

District staff have enhanced the capacity of principals to analyze MEAP results for their own schools by familiarizing them with procedures for item analysis. When a school's students fail to achieve expected goals, the school is expected to identify the areas of need and to develop or modify strategies to address those needs. In addition, any Title I school that is cited for needing improvement in mathematics is required to use some of the Title I funds for staff development in the area of mathematics.

District Support

Support goes hand-in-hand with accountability in Traverse City, permeating and setting the tone for interactions between central office and building-level staff. A number of administrators at the district level provide direct support to schools for improving student performance in mathematics and other content areas, including the senior administrators to whom principals report, the content coordinators, and site facilitators. The senior administrators meet regularly with school principals to focus on developing principals' capacity to serve as instructional leaders and enhancing their ability to identify and address the needs of students and teachers in their schools.

As schools develop their school improvement plans, content coordinators are called on to offer assistance in strategic planning to address the needs of students in specific content areas. Typically, mathematics coordinators assist in the analysis of MEAP results, identify particular resources to address specific needs of students, and share strategies that have worked well for other schools with similar needs.

Site Facilitators are the central office staff who have the most detailed working knowledge of each school's school improvement plan. The site facilitators are responsible for disseminating and monitoring federal, state, and district funds. The site facilitators serve a crucial role in the effective use of funds, particularly Title I and state at-risk dollars. Their role, however, goes well beyond monitoring schools for compliance in their use of funds. The site facilitators are well-informed liaisons between each school building and the sources of fiscal and personnel support available from the district. The facilitators know what funds are available and the regulations for appropriate use. Even more important, however, is the integral role that facilitators play as schools identify both appropriate goals and the strategies for accomplishing those goals. Site facilitators work very closely with schools, focusing on the extent to which the school improvement plan addresses the identified needs of the school. They help schools interpret and use needs-assessment data so that funds coherently address identified needs.

Glenn Loomis Elementary School

Glenn Loomis Elementary School serves about 340 students in grades K–6. More than 95 percent of students at the school are white, and 35 to 40 percent of them receive free or reduced-price lunches. Glenn Loomis enjoys a good reputation in the community and is often selected by students who have the option to enroll in any school of their choice within the Traverse City system.

Like other elementary schools in the district, Glenn Loomis has been phasing in *Investigations in Number, Data, and Space* for the past several years. So far the principal is quite pleased with the performance of his students. School scores on the Michigan Educational Assessment Program (MEAP) test are consistently above the state average. The principal attributes the success of Glenn Loomis students to the new mathematics program. He has found the use of hands-on manipulatives and multiple problem-solving strategies to be an effective approach to mathematics instruction.

District personnel have helped build the capacity of the faculty and staff at Glenn Loomis to identify student needs and develop strategies to address those needs. The principal, for example, is comfortable conducting item analyses of data and engaging the school improvement team in strategic planning. Teachers and classroom aides feel confident in their ability to design and implement sound instruction for their students. They have had extensive opportunities to enhance their understanding of the new mathematics curriculum and to use one another as resources. For example, Glenn Loomis teachers have participated in grade-level meetings with the district content coordinators and teachers and principals from five other elementary schools to share successful strategies for instruction in the content areas, including mathematics.

Title I funds have supported the implementation of the mathematics curriculum in two major ways. The school has used Title I funds to hire three full-time classroom aides, who support the regular classroom teachers and make it possible to give students more individualized attention during the regular class period. Classroom aides participate in district-level mathematics professional development, which has greatly enhanced their value as instructional resources for Title I students and for other students as well. Title I has also been used to hire a teacher who serves both as a reading consultant in the school and as a liaison to the district content coordinators, including the two mathematics coordinators. The principal has found this to be an effective way to maintain regular contact with the coordinators and to keep abreast of new developments in the content areas.

Glenn Loomis has used Title I money to purchase materials needed to effectively implement the mathematics curriculum and to address Title I students' specific areas of need. These include hands-on manipulative materials; supplemental books that target specific needs, such as general test-taking skills; and "organizers" for grade 3–6 students. The organizers furnish a way for parents and teachers to regularly exchange comments with each other about the students' work.

Cherry Knoll Elementary School

Cherry Knoll Elementary School enrolls about 330 students in grades K–6, 32 percent of whom qualify for free or reduced-price lunches. It is a "full inclusion" school, serving all students with special needs through regular classroom instruction. The principal has been extremely pleased with the school's "unified systems approach" to planning. In fact, last year Cherry Knoll Elementary received a state award for its approach to programming, which works toward "integrating all services to support all students."

Data analysis and dialogue among all K–6 teachers at the school is an integral part of the school's planning process. State and local assessment data are used to determine strengths and areas of need. School staff then examine the program and pinpoint problem areas, discuss what strategies should be introduced to improve the program, and identify resources available to put the plan into action. The district mathematics coordinators work closely with school staff in the planning process and assist individual teachers, as needed, to enhance their implementation of the mathematics curriculum.

The principal has found that giving K–6 teachers opportunities to sit down and talk about mathematics has had a tremendous impact on the mathematics program. Teachers at all grade levels are encouraged to take responsibility for their part in developing students' skills and understanding in mathematics, and they see more clearly how students' experiences at each grade level build toward students' understanding of mathematics.

Funds from a variety of sources—state at-risk money, the local general fund, and Title I—are combined to hire personnel and to purchase materials needed to meet the needs of students. The major portion of Cherry Knoll's Title I funding is directed toward the salaries of a reading and mathematics specialist and four teacher aides. The school has used the additional personnel to facilitate a team-teaching approach to instruction that has provided more personalized instruction to students and allowed more flexibility in how classroom instruction is delivered. Without Title I funds to support additional personnel, the school would have to depend on parent and community volunteers, who do not bring the same level of consistency and professional experience to the classroom. Title I funds have been used to enhance professional development for learning assistants by providing more intense and specialized professional development than they would otherwise receive. Also Title I funds are used to offer activities, such as Family Math Nights and classroom meetings, that familiarize parents with the mathematics curriculum.

The principal is enthusiastic about the impact of the school's integrated approach on students:

> The integrated approach means you support all students by using all your means—a lot of team teaching, co-teaching—and Title I supports so much of this. And over the years we have seen that approaching education in this way does have an impact on student success. In the last five years we've been watching our data and have seen student achievement increase in our general population, and also among Title I and Special Education students.

Ysleta Independent School District

In the Yselta Independent School District, the coordination of resources to support high-quality mathematics instruction is encouraged by the strong link between site-based decision making and school accountability. The focus of the state accountability system has been the state testing program, but the new state standards for mathematics and other content areas are also becoming a focal point for site-based management and accountability.

Five years ago, the Texas Education Agency mandated school-based decision making in all districts. In exchange for the autonomy to make their own decisions about curriculum and instruction, schools and districts were held accountable for improving student performance in reading and mathematics on the state testing program, the Texas Assessment of Academic Skills (TAAS). The superintendent set his sights even higher by issuing a bold mission statement and raising academic expectations for every child in the district to the same high level.

More recently, the state adopted the Texas Essential Knowledge and Skills (TEKS), which serves as the state's new curriculum framework; the state test is being revised accordingly. In the meantime, Ysleta ISD is aligning curriculum, instruction, and professional development to the new standards as part of its five-year improvement plan. Directors in the Division of Instruction, including the Title I coordinator, meet regularly to share information about their respective standards-based programs and will eventually consolidate program plans and budgets.

Consolidated budgeting and planning are already taking place in Ysleta schools, all of which are schoolwide Title I programs. Site-based management teams in every school are responsible for using student-achievement data and the district improvement plan to design a standards-based instructional program. To do this most effectively, school-based teams, administrators, and teachers receive extensive assistance from Curriculum Support Specialists in the Division of Instruction. More specialized support for standards-based mathematics improvement is provided by Mentor Teachers, who are funded through an Urban Systemic Initiative. As an added incentive for reform, state and district accountability mechanisms reward schools and teachers for working with all students, especially those in greatest need of academic assistance.

The case description of the Ysleta Independent School District is followed by two examples of how the coordination of resources to support standards-based mathematics education plays out at the school level.

The District

State policy guides district reform in Texas, and Ysleta Independent School District is no exception. The Texas Essential Knowledge and Skills (TEKS) serve as the state's new curriculum frameworks. In 1997–98, the district held a week-long "train-the-trainers" academy for groups of teachers in every subject at every school. These teacher trainers were then responsible for working with their building-level colleagues to help them understand and implement the new state standards, lesson development, and higher-order thinking skills. Full implementation of the TEKS in all content areas is expected in the 1998–99 school year.

Testing and accountability are also driven by state policy. The state testing program, Texas Assessment of Academic Skills (TAAS), is currently being revised and updated to better reflect curriculum and instruction emphasized in the TEKS. In the meantime, the district is developing related assessments to be used diagnostically. In 1993, the state mandated school-based decision making in all districts and now holds districts and schools accountable for student performance. Ysleta schools have evolved specific mechanisms for site-based decision making. In addition, the district holds individual teachers accountable for student performance.

Five years ago, when districts were just beginning to grapple with site-based decision making, Ysleta ISD hired a new superintendent, Anthony Trujillo, to guide the transition to school-based management and accountability. To both challenge schools and give them direction, Superintendent Trujillo drafted the following mission statement: "Every student who enrolls in our schools will graduate from high school fully bilingual and prepared to enter a four-year college or university." As one district administrator described it, this mission statement is "a guiding light for everything." District and school staff are responsible for planning and implementing instructional programs that enable students to achieve the superintendent's vision for them.

When Superintendent Trujillo came on board, the district had a long way to go, especially in mathematics achievement as measured by the TAAS. Through a combination of district leadership and support, school autonomy, and accountability, Ysleta ISD has experienced dramatic improvements in student achievement and has become the "first and only" urban school district in the state to be recognized for its accomplishments by the state's accountability system. Eight-six percent of schools in the district (forty-four out of fifty-one regular campuses) have achieved individual distinctions. To attain such recognition, schools had to reach high levels of student performance in both mathematics and reading on the TAAS.

According to the superintendent, the "miracle of Ysleta" is that the district (and schools) have accomplished as much as they have, given the low socioeconomic background of students. Ysleta ISD serves approximately one-third of all school children in the El Paso metropolitan area and is one of the state's "Big 8" urban school districts. Of the 47 000 students enrolled on fifty-eight campuses (including seven alternative schools), 89 percent are minority (mostly Hispanic), 68 percent receive free or reduced-price lunches, and 22 percent are limited English proficient. Making the district's accomplishments even more remarkable is the fact that they have been achieved in spite of a contentious relationship between the superintendent and the local school board.

The Mathematics Program

Mathematics has historically been Ysleta's academic Achilles heel. Prior to site-based management, students in all tested grades in the district (grades 3–8 and 10) performed well below state averages on the mathematics portion of the TAAS. Today, the district's strongest emphasis is in mathematics and the effort has begun to pay off. Performance has improved to the point that Ysleta students now perform at or above state averages in all but the tenth grade. District administrators attribute accelerated student performance to prolonged teacher professional development in both content and pedagogy.

In addition to building teacher capacity, the district effectively raised expectations for all students when it eliminated the "Fundamentals of Math" course, a "watered-down" pre-algebra course for low-achieving students, and increased the high school graduation requirement to four years of mathematics, beginning with Algebra I in the ninth grade. The district estimates that about 30 percent of students are enrolled in the "general plan," which includes Algebra I, Geometry, Algebra II, and Mathematical Models. The approximately 70 percent of students enrolled in the "honors plan" take Pre-Calculus in their senior year instead of Mathematical Models.

In collaboration with two other El Paso area districts (the El Paso and the Socorro Independent School Districts), and with funding from the National Science Foundation's Urban Systemic Initiative (USI), Ysleta ISD further refined the state standards, or TEKS, for mathematics into regional mathematics education standards. According to former USI director Maria Gutierrez (now an Executive Director of Instruction), the regional standards are more detailed than the state standards and more aligned with NCTM standards than the TEKS.

State and regional standards build the general scaffolding for the mathematics instructional program and define the outcomes for which schools and teachers are held accountable. Beyond this, there is no "centralized approach" to teaching mathematics within a grade level or across schools. Associate Superintendent Manny Soto describes Yselta ISD as "a very open system that allows for experimentation, where the process of how they do it is negotiable, but the result or the outcome is not." Schools are reimbursed for purchasing textbooks on the state-adopted list, but many request waivers in order to implement other programs. For the most part, schools also decide what professional development they will seek in mathematics and in other content areas.

USI Mentor Teachers

The district relies on a cadre of centrally based Mentor Teachers, funded through an Urban Systemic Initiative (USI) grant from the National Science Foundation, to facilitate mathematics curriculum implementation in Ysleta schools. In all, the district has eleven USI Mentor Teachers with expertise in elementary, middle, or high school mathematics. Mentor Teachers have been assigned to all schools in the district, where they serve as a resource to help mathematics faculty align their chosen curriculum with the state and regional standards. In addition, USI Mentor Teachers also provide professional development on the TEKS mathematics standards.

One objective of the USI, also known as the El Paso Collaborative for Academic Excellence, is to promote and support the use of standards-based materials. Programs supported by the Collaborative include *Investigations in Numbers, Data, and Space* (K–5); *Connected Mathematics Program*, or CMP (6–8); and a high school Algebra/Geometry curriculum developed by the Systemic Initiatives for Montana Mathematics and Science (SIMMS). An important role of the USI Mentor Teachers has been to assist schools that want to implement these challenging curricula. On request, Mentor Teachers provide staff development and other types of technical assistance. As of the 1997–98 school year, five out of thirty-three elementary schools were using *Investigations*, four out of twelve middle schools had adopted CMP, and four out of seven high schools were implementing the SIMMS program.

Coordination of Resources

In the Ysleta Independent School District, Title I, Eisenhower, and IDEA funds are allocated to schools by formula, and schools decide how to use these funds to support mathematics instruction. Additional money is available through competitive Title VI grants, which are largely earmarked by the district for innovative mathematics programs. Ysleta ISD also has a Title VII/Bilingual award to build the academic capacity of Spanish-speaking parents and Bilingual Education teachers and administrators in mathematics and other subjects. The district's share of NSF/USI money is used to pay the salaries of fifteen Mentor Teachers, eleven of whom have expertise in mathematics.

Title I is by far the largest source of federal funds provided to Ysleta ISD, which receives an annual Title I allocation of approximately $12 million. About 15 percent of the district's Title I allocation is used to pay the salaries of a small central office administrative staff (director, compliance coordinator, and funds supervisor) and to fund several school initiatives.

School initiatives include technology matching grants, special support teachers for campuses in need of additional instructional assistance, and minigrants to teachers for special projects. The last initiative is supplemented with Title VI and Eisenhower funds as well.

The remaining 85 percent of Ysleta's Title I allocation goes directly to schools, all of which are schoolwide Title I programs. Director of Compensatory Education Alice Davis estimates that schools use about 40 percent of their Title I money to support mathematics instruction. District guidelines "strongly discourage" schools from using all of their Title I funds to pay for professional staff. The concern is that because the funds are not guaranteed from year to year (depending on the enrolled student population), schools should invest a third or more of their allocation in nonrecurring costs, such as instructional materials, professional development, or technology.

The population of students in Ysleta ISD is fairly homogeneous. According to the Director of Compensatory Education, "Our students are pretty much one and the same. Gifted and talented students are economically deprived, at-risk students are gifted and talented, and so on." Working with a relatively uniform student population, and setting the same high expectations for all of them, simplifies the planning of a coherent mathematics program. In addition, there are several mechanisms operating at either the district or the building level to facilitate the convergence of resources toward mathematics improvement efforts.

District Leadership and Coordination

The District Educational Improvement Council (DEIC) is an important instructional leadership mechanism in Ysleta ISD. The Council is composed of teachers and community members who are elected by their constituencies. Associate Superintendent for Instruction Manny Soto serves on the Council as district liaison. The current chair, elected by fellow DEIC members, is a classroom teacher. Council members receive some leadership training from the district. Recently, the district adopted a five-year District Improvement Plan, which was developed by the DEIC in conjunction with a group of principals, some additional central office personnel, and an external facilitator. Ysleta ISD uses the District Improvement Plan as the framework for resource utilization related to student performance, professional development, technology, community engagement, and facilities. The ongoing role of the DEIC is to sanction all districtwide initiatives (e.g., teacher induction or the Urban Systemic Initiative) and to approve individual school requests for policy waivers, ensuring that all such initiatives and requests are consistent with the goals and objectives set down in the District Improvement Plan.

Since districtwide instructional initiatives typically emerge from the Division of Instruction, this is the first level of the system to be affected or guided by the District Improvement Plan. The offices of Compensatory Education, Professional Development, the Urban Systemic Initiative, Bilingual Education, Special Education, Vocational Education, and Research and Testing all are housed in the Division of Instruction. Two Executive Directors of Instruction in the division are directly responsible for instruction on the school campuses. As a group, all directors in the division meet weekly with the Associate Superintendent for Instruction to discuss their programs and to see how they can support one another to meet district goals and objectives. As a result of this increased interaction, the division is moving toward the development of a consolidated plan and budget.

School Coordination and Accountability

School strategies for using resources to implement the district's five-year improvement plan are negotiated by Campus Educational Improvement Councils (CEICs). These Councils are site-based management teams whose make-up reflects the composition of the District Educational Improvement Council (e.g., teachers, parents, other community members). The members of the campus site-based decision-making teams receive some initial orientation and leadership training from the district to effectively carry out their responsibilities. The

CEIC advises the principal on matters relating to the school budget, staff development, personnel, curriculum, and facilities. Their areas of influence include the interpretation of needs-assessment data (including student performance on the TAAS) and the subsequent allocation of Title I and other resources. The CEIC also approves the annual Campus Action Plan, which is typically written by the department chairs, grade-level representatives, or both, and reviews the plan and the results periodically to ensure effective implementation.

In exchange for their decision-making autonomy, schools are accountable to the district and the state for achieving results on the TAAS in reading, writing, and mathematics. Student performance data are disaggregated for Hispanic, African American, white, and low-income students. School accountability ratings are then based on the achievement of the lowest-performing student group. Schools receive an honors rating of "recognized" if the lowest-performing group achieves an 80 percent passing rate on each section of the TAAS. In other words, for each section of the TAAS (reading, writing, mathematics), each student group (Hispanic, African American, white, and low income) must have a passing rate of at least 80 percent to be "recognized." A school is rated "exemplary" if each student group achieves at least a 90 percent passing rate in each subject. Low-performing schools risk being taken over by the state. To further challenge schools to serve all students well, data used to calculate school accountability ratings will soon include TAAS results for Bilingual and Special Education students (in 1999 and 2000, respectively).

Ysleta ISD has added another layer to the state's accountability system. Part of the appraisal of teachers is now linked to student performance. Individual student scores are summarized by the Texas Learning Index (TLI), which includes composite scores for both reading and mathematics. With the help of a private testing company, Ysleta estimated that on average, a student's TLI should increase by about 4 points each year. Average change in the TLI by classroom is associated with the classroom teacher and is used to identify "marginally effective" teachers—that is, those whose students do not achieve the expected average growth in the TLI. The district uses these data to develop professional-development programs for these teachers. Teachers have three to four years to improve student performance before any sanctions are applied because the district has no interest in having any teacher fail.

District Support

When developing and implementing the mathematics section of the Campus Action Plan, school writing teams can call on the USI Mentor Teachers for assistance. To provide broader support in developing and implementing school plans, the district created four Assessment and Support Teams, each one serving a specific geographic area of the district. Now that student performance has improved so dramatically, the district has scaled back to two teams. Each team is chaired by an Executive Director in the Division of Instruction and staffed by seven Curriculum Support Specialists (fourteen in all). According to one Executive Director, "The Curriculum Support Specialists are a critical part of making site-based management work."

Curriculum Support Specialists offer several types of assistance to schools. They are often called on to help facilitate the site-based planning process, and they customarily review and comment on Campus Action Plans before plans are submitted to the Associate Superintendent for Instruction. As the school year progresses, the Curriculum Support Specialists monitor the implementation of Campus Action Plans on the basis of their interactions in the schools as well as periodic reports by the Campus Educational Improvement Councils. Specialists are also providing teachers and principals with staff development on the new state standards, the Texas Essential Knowledge and Skills (TEKS). Teams of teachers from each school are being trained to give their colleagues an overview and understanding of how to implement the standards in their classrooms. Training related to the mathematics standards is coordinated with the USI Mentor Teachers. In general, Curriculum Support Specialists and Mentor Teachers are beginning to coordinate their efforts more to reinforce and support the programs that each is implementing for mathematics education in the schools.

Indian Ridge Middle School

Indian Ridge Middle School is one of twelve middle schools in the Ysleta Independent School District. Of the 710 students currently enrolled, approximately 70 percent are Hispanic and 3 percent are African American; the remaining 27 percent are white. More than half of all students at the school (55 percent) are eligible for free or reduced-price lunch.

Indian Ridge received Title I targeted assistance funds for the first time in 1997–98 and became a schoolwide Title I program in 1998-99. The Campus Educational Improvement Council (CEIC) now doubles as the School-wide Planning Committee. As such, the CEIC is responsible for schoolwide needs assessment and planning, which includes the consolidation of Title I and other funds, to support the implementation of the school's Campus Action Plan.

When site-based decision making was first mandated by the state, the CEIC identified mathematics achievement as the area in greatest need of improvement at Indian Ridge. According to the principal, "Our math TAAS scores were very obviously where the gap was, and there was no question that that's what we had to tackle." In search of a curriculum that would improve students' mathematical literacy and lay the foundation for ninth grade Algebra, the principal became interested in the *Connected Mathematics Program* (CMP). After considerable study of the program, the mathematics faculty agreed to give it a try. The implementation of CMP is now the centerpiece of the school's Campus Action Plan for mathematics. With the support of USI Mentor Teachers in the district and professional development through the El Paso Collaborative for Academic Excellence, Indian Ridge has gradually expanded the implementation of CMP to the whole school, which serves grades 7 and 8.

Title I is a crucial resource for the continued, effective implementation of CMP at Indian Ridge. First of all, Title I money and regular school funds are used to purchase hands-on materials and classroom sets of books for CMP and to defray some of the costs of professional development related to the implementation of CMP (e.g., substitute pay). More important, Title I in combination with State Compensatory Education money is used to double the school's mathematics faculty from five to ten teachers. Teachers found it difficult to maintain continuity from one lesson to the next with only 45 minutes of mathematics instruction a day. So the school initiated an A-B block schedule, which would normally allow 80 minutes of instruction in a given subject on alternate days. To give students 80 minutes of instruction *every day*, the CEIC allocated Title I and other funds to hire five more mathematics teachers.

As a targeted assistance school, Indian Ridge had difficulty "finding enough ways to use that kind of money [$80 000]" on targeted kids only. As a schoolwide program, the school can now use its Title I allocation more efficiently to serve all students. Nevertheless, faculty and staff recognize the need to stay focused on the students with the greatest needs. A 45-minute "prep class" is built into the middle of every school day, which provides additional time for instruction for students who need extra attention. Three days a week, this period is earmarked for additional instruction in reading, writing, or mathematics—the subjects tested on the TAAS. On the other two days, teachers can provide more individualized instruction in any subject to students with the greatest needs. Faculty in each academic block also have the flexibility to design tutoring programs that meet the specific needs of their students.

Bel Air High School

Bel Air High School is one of seven four-year high schools in the Ysleta Independent School District. Nearly 2200 students are enrolled at this campus; 95 percent of them are Hispanic. Sixty-five percent of students participate in the federal lunch program. Following several years of poor performance on the TAAS, Bel Air was reconstituted by the district three years ago to avoid imminent takeover by the state. All teachers had to reapply for their jobs.

Twenty-five percent of the faculty was rehired; most of the other 75 percent of teachers either are just out of college or have recently entered teaching through an alternative certification program.

To coordinate the reconstitution process, the principal hired a Dean of Instruction whose salary is paid from a combination of Title I and district funds. The position is equivalent to an assistant principalship but bears no responsibility for scheduling and discipline. In the beginning, the Dean's role was to guide the development of a new vision and five-year plan for Bel Air. Her ongoing responsibility is to oversee curriculum, instruction, and assessment in the core subjects, which includes monitoring how Title I and other funds are used to support mathematics and reading. In general, it is her job to make sure that teachers get whatever they need to be effective in the classroom—from professional development to equipment and supplies.

Early in its new incarnation, the Campus Educational Improvement Council (CEIC) at Bel Air identified mathematics as an area of serious need. In particular, the rate of student failures in algebra was unacceptably high and had remained so for several years. To turn things around, the school hired a mathematics coordinator, upgraded the mathematics computer lab, and adopted the combined Algebra/Geometry curriculum for freshmen that was developed by the Systemic Initiatives in Montana Math and Science (SIMMS). Each of these school initiatives is funded substantially with schoolwide Title I resources.

The Title I math coordinator staffs the school's Math Center or computer lab. She uses achievement data to identify students who are not performing well on the TAAS and gives them one-on-one tutoring in the Math Center. In addition to a gallery of networked computers (which will soon have Internet access), the Center also has office space for the math coordinator and storage for hands-on instructional materials and calculators, including TI-92 graphing calculators. The Math Center is open daily from 7:30 A.M. to 5:00 P.M. All students come in for at least 45 minutes a week for remediation and reinforcement of skills or to work on teacher-designed labs and other exploratory exercises.

The Dean of Instruction learned of SIMMS through the El Paso Collaborative for Academic Excellence, which is the local Urban Systemic Initiative (USI). A group of mathematics teachers from Bel Air explored the curriculum through the Collaborative, and the mathematics department adopted it two years ago. Title I pays for SIMMS instructional materials and release time for teachers to attend related professional-development programs. Students who have not taken algebra in the eighth grade now take SIMMS integrated Algebra/Geometry in the ninth grade at Bel Air, receiving 90 minutes of mathematics instruction a day for the entire school year. The Dean already sees evidence that students in the course are better prepared for both the state end-of-course Algebra test and the tenth grade TAAS mathematics exit exam.